

Journal of Mycology

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Entered as Second Class Matter, Post-office at Columbus, Ohio.

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ADDRESS: EDITOR JOURNAL OF MYCOLOGY

Journal of Mycology

VOLUME II

W. A. KELLERMAN

COLUMBUS, OHIO

1905

DATES OF ISSUE

Pages 1-48 were issued January 4, 1905

Pages 49-104 were issued May 29, 1905

Pages 105-152 were issued July 19, 1905

Pages 153-200 were issued November 11, 1905

Pages 201-232 were issued December 16, 1905

Pages 233-274 were issued December 22, 1905

For Table of Contents of the several bi-monthly

parts see pages 1, 49, 105, 153, 201,

and 233 respectively.



W. N. Latourelland
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VOLUME 11—JANUARY 1905

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SPHÆRIA CALVA TODE.

A. P. MORGAN.

SPHÆRIA CALVA: *simplex, sparsa, atra, papillata; hemisphærio superiore glabro, inferiore hispido.* Tode, Fung. Meckl.

This species was described by Tode as well as could be done at that time. It was not found by Persoon or by Albertini and Schweinitz. It was recognized by Fries; he observed that it was rare. Schweinitz records the species in the N. A. Fungi as found at Bethlehem, Pa. It appears in Saccardo's Sylloge, in the first volume as *Rosellinia calva*, in the second volume as *Lasiosphæria calva*. Berlese has not seen it. Ellis and Everhart have avoided it entirely.

I have several times found specimens which for want of a better name I have labeled *Rosellinia calva* (Tode). I may describe them as follows.

ROSELLINIA (CONIOCHÆTA) CALVA Tode.—Perithecia superficial, globose or ovoid, black, rough, papillate, naked above and clothed about the middle with very short black bristles. Ascii cylindric, 8-spored, the spores obliquely uniseriate, with a short stalk, 100 - 110 x 11 - 14 mic., the spores brown, oval to ellipsoid, smooth, 14 - 18 x 10 - 12 mic.

Growing on old wood of *Liriodendron*; Preston, O. Perithecia gregarious, close or scattered; .25 - .30 mm. in diameter.

A NEW SPECIES OF SPHAEROSOMA.

FRED JAY SEAVER.

The genus *Sphaerosoma* was first described by Klotzsch about the year 1840 and was then represented by one species, *Sphaerosoma fuscescens*, which was described by him at that time, the exact description being given below for the purpose of comparison. Since that time two other species have been reported, *Sphaerosoma ostiolatum* Tulasne, *Fungi Hypogaei*, p. 184; and *Sphaerosoma fragile* Hesse. *Jahrbuecher fuer Wissenschaftliche Botanik*, published by Pringsheim, pp. 248 to 254.

CLASSIFICATION OF SPHAEROSOMA.

DISCOMYCETES.

Ascomycetous fungi with the hymenium, or fruiting surface, well exposed at maturity.

HELVELLINEÆ.

Receptacle stipitate and more or less clavate or pileate, or sessile and spreading; fleshy, waxy or rarely gelatinous. Hymenium always exposed.

RHIZINACEÆ.

Receptacle fleshly-waxy, brittle, sessile. Hymenium exposed from the first, plane or convex. Ascii cylindrical, operculate. Paraphyses numerous, free.

SPHÆROSOMA KLOTZSCH.

Receptacle fleshy, sessile, convolute, roundish, outer surface covered entirely by the hymenium, within sterile. Ascii cylindrical. Sporidia spherical, verrucose, hyaline.

SPHÆROSOMA ECHINULATUM Seaver n. sp. Plants gregarious or scattered, occasionally crowded, sessile, 1 to 8 mm. in diameter; at first almost spherical and regular in outline, becoming convolute with age, especially on the upper surface, often umbilicate; lower surface sterile, nearly plane, attached to the soil near the center by delicate hyphæ, very easily detached; at first white or whitish becoming reddish-brown on the exposed surface, then dark brown; the color begins with a brown spot in the center of the upper surface and spreads until it covers all of the exposed surface; at maturity having a brown velvety appearance due to the large, brownish paraphyses which extend far beyond the ascii; under-surface light colored; hymenium at maturity covering the exposed surface of the plant, composed of very large ascii and paraphyses; ascii 40 to 50 by 300 to 500 mic., clavate, 8-spored; sporidia globose, at first smooth, filled with numerous guttulae, and surrounded with a transparent exospore, gradually becoming rough on the outside, at maturity covered with spines which are several times as long as broad; spines 4 to 5 mic. in length by

2 to 2.5 mic. broad at the base, often bent at their apices, at maturity extending to the outer surface of the exospore; spore, excluding exospore 25 mic. in diameter, including spines or exospore, 35 mic. in diameter; paraphyses large, clavate, septate, brownish, 12 to 15 mic. in diameter at the apex; sterile part of the receptacle composed of rather loosely interwoven hyphæ, grading into pseudo-parenchyma, cells large.

Habitat—On the surface of damp soil between the tufts of grass in an open place, in the margins of woods near Iowa City. Plants collected from June to October.

The specific name under which these plants are described is suggested by the character of the markings of the spores, which are distinctly echinulate.

The description and measurements given above were made from fresh material collected at different times. Specimens preserved in alcohol vary somewhat; the most of the color disappears and the plants are a little contracted and the measurements are therefore a little less.

The plants described above were collected during the later part of the month of June in the summer of 1904, in large numbers in a ravine near Iowa City and upon examination were at once referred to this genus. The individuals are at first almost spherical in form, smooth on the outer surface, and of a whitish or lead color. As they mature, a small, brown spot is formed in the center of the upper surface, the brown color gradually spreading until it covers all of the exposed surface. They are at first regular in outline, becoming, at maturity, irregularly convolute and more or less depressed, so that at maturity the plants are roundish but more or less irregular in form, of a deep brown color and with a soft velvety appearance. Examination of sections of young plants shows the brown spot on the upper surface to be the beginning of the development of the hymenial layer and the brown color and velvety appearance to be due to the large paraphyses which contain brown coloring matter.

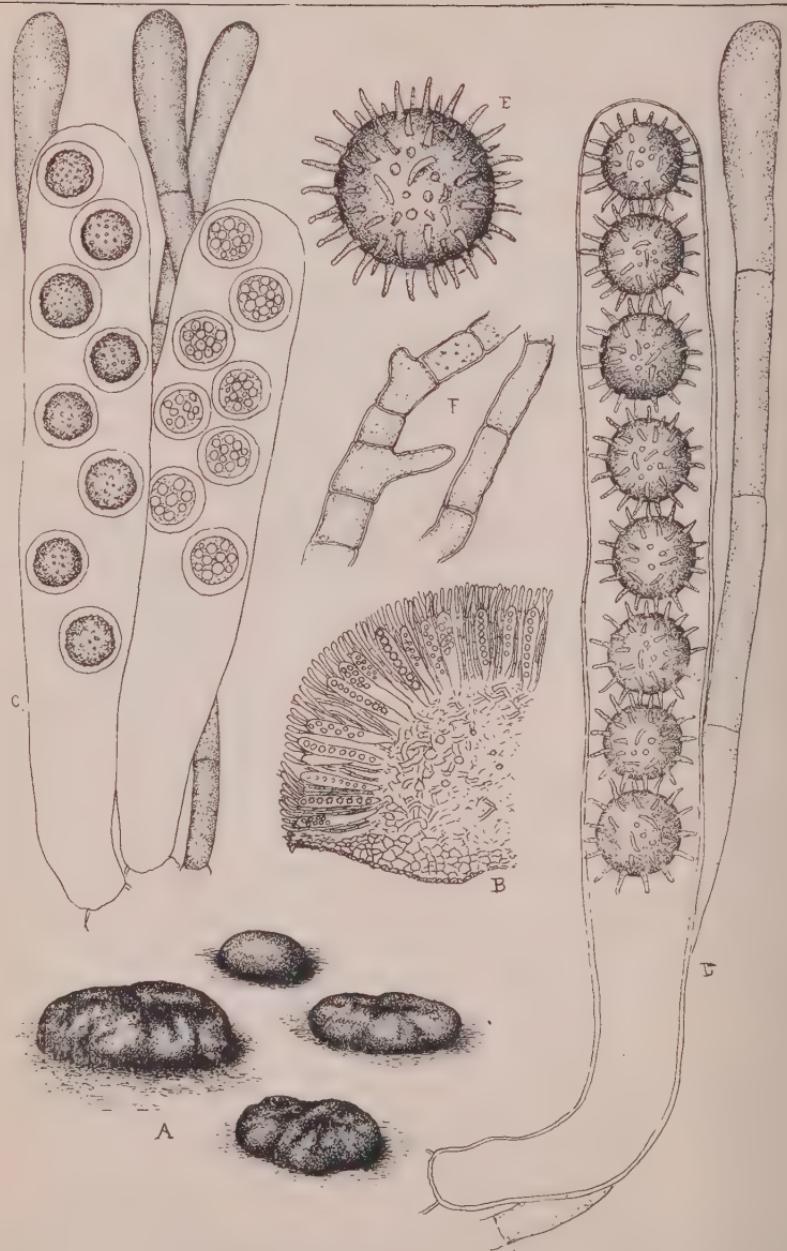
During the early stages of their development, the spores are located near the end of the ascus; they then spread out and become alternately arranged as shown in the diagram and at last are disposed in one row. They are at first smooth and filled with numerous oil drops which disappear as the spore matures and the whole body of the spore is surrounded by a transparent exospore. The first appearance of the roughenings on the outer surface occurs at the periphery of the spore proper within the exospore, the thickenings being at first very slight but gradually increasing until they reach the outer surface of the exospore. When mature a faint line may often be seen near the tips of the spines which is the boundary of the exospore but these become indistinct and in alcoholic specimens and often in mature spores of fresh material the boundary of the exospore is not visible at all, although at

an earlier stage it is very distinct. All gradations may be found between the smooth and echinulate spores, so that they are at first smooth, then verrucose and at last echinulate. The description and drawing of the verrucose markings on the surface of the spores of *Sphaerosoma fuscescens* Klotzsch might be explained by the fact that they were studied while immature, but this is not likely to be the case for both mature and immature forms are present in older specimens in the same plant. Microscopic examination shows on the surface in addition to the spines markings which resemble reticulations, but these are short and not continuous and are not seen at the periphery so that they are probably only spines bent so as to give this appearance.

The relative position of the hymenium is shown in cross-section and also the relation of the asci and paraphyses and the structure of the sterile part of the receptacle. The paraphyses are seen to be relatively large and to extend some distance beyond the asci. Beneath the hymenium the interwoven hyphæ give rise to a sort of pseudo-parenchyma which is more definite near the base where the cells are smaller.

Each of the other species described is reported as occurring in woods under leaves and thus showing a tendency to become subterranean species. *Sphaerosoma fragile* is described by Hesse as "ein unterirdisch-wachsender Discomycet." The plants described here vary in this respect, being found on the margin of a swampy place on the surface of rather hard, damp soil, in the shade of scattered tufts of grass, in a small ravine in the woods. They are attached to the soil by hyphæ which are so delicate that it is difficult to collect the plants without having them broken from the substratum.

These plants were collected in large numbers over a limited area and are generally more or less scattered but often several are crowded together. They were first found in this locality during the latter part of June but probably appeared much earlier than this. Frequent collections and studies were made in the field from this time until the first of October. The place was next visited in the latter part of September but at this time none of the plants could be found as the ground was covered with other forms of vegetation. Since these plants occur in such large numbers over this limited area it is likely that they will appear in the same locality during the next season, as such has often been found to be the case with other forms of Discomycetes. During the last three seasons, *Sphaerospora confusa*, another Discomycete has been collected in abundance on a sandy bank, over an area limited to a few rods in diameter from spring until autumn, but has never been collected in any other locality near Iowa City so far as is known. The same has been found to be true of other species where the habitat is constant. For these reasons these plants will be expected to appear in this locality again.



SPHAEROSOMA ECHINULATUM SEAVER n. sp.

SPILÆROSPORA FUSCESCENS Klotzsch.—Dietrich; Flora Regni Borussici, Vol. VII, No 467 (1839). Receptaculo solidio, sphærico, nudo, gibboso, interdum depresso, sessili; basi fibrilloso, primo extus interusque sordide-albido v. pallido-gilvo, dein fuscente; ascis immersis, clavaeformibus, hyalinis; paraphysibus verrucosis, hyalinis.

The present species is distinguished from *Sphaerosoma ostiolatum* Tulasne, and *Sphaerosoma fragile* Hesse, by its solid receptacle and is then more closely related to *Sphaerosoma fuscescens* Klotzsch, the exact description of that species being given above for the purpose of comparison. The general description of the two species seems to be identical, except as to habitat and size of the plants. The characters which distinguish this species from the one described by Klotzsch are the size of the ascii and spores and the markings on the surface of the spores. The measurements of the ascii of *Sphaerosoma fuscescens* as given by Engler-Prantl in "Die Natürlichen Pflanzen-Familien" are from 22 to 26 mic. in diameter and the spores 17 to 20 mic. in diameter, while the ascii of the plants described here are 40 to 50 mic. in diameter and the spores 30 to 35 mic. They are also distinguished by the slender spines on the surface of the spores instead of the verrucose markings described by Klotzsch. These markings are very distinct.

In preparing this paper I am indebted to Dr. William Trelease, director of the Missouri Botanical Garden for the use of literature belonging to that institution; to Dr. Farlow of Harvard, Prof. Underwood of Columbia, and to Mr. J. B. Ellis of Newfield, N. J., for suggestions in regard to the distribution of the genus, and to Profs. Machride and Shimek for kindly aid in preparing the work.

EXPLANATION OF PLATE.

Fig. A, Several plants at different stages in their development, $\times 5$.

Fig. B, Portion of a section of one of the plants showing relation of hymenium, $\times 50$.

Fig. C, Ascii and paraphyses, showing two different stages in the development of the spores, $\times 500$.

Fig. D, Mature ascus and spores with paraphysis, $\times 600$.

Fig. E, One spore removed showing the echinulate markings on its surface, $\times 1200$.

Fig. F, A portion of the mycelium from the soil, $\times 1000$.

SYDOW'S MONOGRAPHIA UREDINEARUM, WITH
NOTES UPON AMERICAN SPECIES.

J. C. ARTHUR.

The laudable attempt to describe and illustrate uniformly all known species of the *Uredineae*, undertaken by P. and H. Sydow,* has progressed to the completion of the first volume. This volume contains 1226 species, all so far known under the genus *Puccinia*, and a much larger number than the size and complexity of the family would seem to warrant. But all criticism regarding the accepted boundaries of the genus may well be laid aside in view of the successful manner in which the work of describing the species has been carried out. Nevertheless, one can not help regretting that the wholly unlike, and but distantly related, genus *Uropyxis* should have been engulfed in this maelstrom of two-celled spores, after it had been so clearly shown by Magnus to be distinct. Except as part of the useful *Sylloge* by Saccardo, which attempted little more than to collate published accounts of the species, no systematic and uniform treatment of all known species of this large family has ever been undertaken. The present work has entailed an enormous amount of labor. In citation of literature, in collation of items regarding hosts and geographical distribution, and in verifying and unifying the diagnoses, evident care has been exercised, and a large degree of accuracy attained. Nearly half the species are illustrated with original outline drawings. The authors state that to accomplish this work they examined some 30,000 specimens. We may well believe them when they say that "wir haben mit voller Lust und Liebe an dem Werke gearbeitet"; and the reward of well merited success should be theirs.

The thirty pages of the introduction contain much descriptive, historical and statistical information. A very interesting list is given of authors of new species, with the number of species which they described each year from the time of Persoon, 1794, to the present time. In the matter of geographical distribution one is naturally surprised to find that just twice as many endemic species are credited to America as are found in Europe. One fourth of all the species inhabit the *Compositae*, and one eighth of them occur on the *Gramineae*. The six families which support the next largest number of rusts are *Umbelliferae* with 88 species, *Cyperaceae* with 53, *Liliaceae* with 47, *Labiatae* with 45, *Rubiaceae* with 38, and *Ranunculaceae* with 36.

Sydow, P. and H.—*Monographia Uredinearum seu specierum omnium ad hunc usque diem descriptio et adumbratio systematica. Volume I, Genus Puccinia, cum XLV tabulis.* Lipsiæ, Fratres Bornträger, 1904. pp. xv+972. 8vo.

The arrangement of the text and indices is excellent. The illustrations are helpful, although usually confined to the teleutospores and drawn with a freer hand than seems either necessary or desirable. The serial numbering of the illustrations is bad. If each one had been given the text number of the species, it would greatly have facilitated their use.

The most notable advance, which this work shows in the grouping of the species, is their segregation according to hosts. It can not be said that this method indicates relationship, but it is a fine safeguard against the confusion of species having teleutospores of similar appearance. The Schroeterian classification, based on the number of spore-forms in the species and their behavior, was wisely discarded.

No one believes that such a work can be perfect; errors must necessarily creep in, due to many causes, even if, as in the present case, every reasonable care has been exercised by the authors to insure accuracy. The following notes upon the American species are not to be taken, therefore, as a criticism of the work, but as a contribution to the subject. Much of what is here given has been learned through recent studies, and constitutes heretofore unpublished information. The species are taken up in the order adopted in the work, and the text numbers are retained for ready reference.

No. 6. *PUCCINIA CORNIGERA* E. & E. should be made a synonym of *P. Actinellae* (Webb.) Syd.

No. 10. *PUCCINIA LONGIPES* Lagh. should be made a synonym of *P. Vernoniae* Schw. This name is founded upon an error. Schweinitz described *P. bullata* from dead stems "variarum plantarum v. c. Ambrosiae, Chenopodii" (Syn. Fung. Car. p. 74), which statement was copied by Link (in Linné, Sp. pl. 6²:75). In his later work (Fungi of N. Amer. p. 295) Schweinitz gives the host for this species as "Vernonia novaehoracensis," a correction which Lagerheim and others seem to have overlooked. This caulicolous form of the species with its extraordinarily large sori is not infrequently collected, but almost always on dead stems, where the contrast of color makes it conspicuous. No rust has ever been found on the stems of either *Ambrosia* or *Chenopodium*.

No. 13. *PUCCINIA APLOPAPPI* Syd. is a synonym of *P. tuberculans* E. & E. The differences noted by the author are only the natural variation of the species, due to changed environment.

No. 17. *PUCCINIA SIMILIS* E. & E. is a synonym of *P. Absinthii* DC. The aecidia described are undoubtedly a part of the species. No accidia are described under *P. Absinthii*, although this stage belongs to the species.

No. 19. PUCCINIA RECONDITA D. & H. belongs under *P. conferta* D. & H. This species is also found in Washington, New Mexico and Oklahoma.

No. 26. PUCCINIA MAGNOECIA E. & E. The only character that definitely separates this species from *P. Asteris* Duby is the large sorus, and even this sometimes shows all gradations to the small sorus. The type of the species which is in the herbarium of the N. Y. Botanical Garden has recently been examined at my request by Dr. Rydberg and Professor Earle, and is found to be *Aster Cusickii* A. Gr., not *A. pulchellus*, as heretofore supposed. The form with large sorus is found upon other species of aster, however, and is essentially the same in appearance as *P. Gerardii* Pk., which is no longer maintained as a separate species. It can not be foretold what cultures, and more extended study, may develop, but at present there seems to be no good reason for maintaining the forms with large sori as separate species.

No. 62. PUCCINIA CYANI (Schleich.) Pass. has recently been found in the United States by Charles H. Peck at Menands, N. Y. (see Rep. N. Y. St. Mus. for 1903:25).

No. 49. PUCCINIA CICHORII (DC.) Bell. was found at Burlington, Vt., Aug. 11, 1898, by T. E. Hazen, and at Oaks Corners, N. Y., Sept. 16, 1904, by H. S. Jackson.

No. 76. PUCCINIA ENDIVIAE Pass. was reported from this country last year, having been collected at Hamden, Ct., Oct. 14, 1903, by G. P. Clinton (Rep. Conn Exper. Sta. for 1903:321).

No. 80. PUCCINIA INCLUSA Syd. is a synonym of *P. Cirsii* Lasch, without any doubt, as in fact the authors indicate in the appendix.

No. 82. PUCCINIA CALIFORNICA Diet. is also a synonym of the variable species *P. Cirsii* Lasch.

No. 122. PUCCINIA CONFLUENS Syd. is but an incidental variation of *P. Erigerontis* E. & E. The species has also been collected on *Erigeron Eatoni* at Laramie Hills, Wyo., Aug. 8, 1901, by Aven Nelson, and on *E. microlonchus* at Willow Creek, Wyo., July 1, 1898, by Elias Nelson.

No. 141. PUCCINIA GUTIERREZIAE E. & E. is a synonym of *P. Grindeliae* Pk.

No. 173. PUCCINIA LAGOPHYLLAE D. & H. should be made a synonym of *P. Hemizoniae* E. & T.

No. 197. PUCCINIA NARDOSMIAE E. & E. appears to be a synonym of *P. conglomerata* (Str.) K. & S. The host genus is very closely related to *Homogyne*, on which the European rust has been collected, and the fungus from the two countries does not appear to differ.

No. 231. PUCCINIA EXPANSA Lk. This species has not yet been found in America. The collection on *Senecio lugens* from California (Sydow, Ured. No. 782) referred to under this species belongs to *P. subcircinata* E. & E.

No. 241. PUCCINIA TRACYI Sacc. & Syd. is undoubtedly a synonym of *P. Solidaginis* Pk. The differences in appearance of the sori and spores are such as are found in all leptopuccinious species, and are due in part to the changes in structure which are correlated with the germinating or resting condition, for all such species possess the double physiological role of summer spores and winter spores. The apical walls of this species vary from quite thin and rounded to enormously thickened and beaked.

No. 268. PUCCINIA VERBESINAE Schw. was described originally from material collected in South Carolina, on "Verbesina, Siegesbeckia et aliis." These host names cover *Verbesina occidentalis* Walt., *Siegesbeckia occidentalis* L., and *Verbesina Siegesbeckia* Michx., all referring to the same species, and now generally known under the first name. So far in my studies I do not find that the true *P. Verbesinae* Schw. has been reported upon any other than the type host. Its range is the southeastern United States, from West Virginia to Alabama. All other hosts cited by Sydow under this number should be referred to the preceding species *P. cognata* Syd. The latter species ranges from Texas southward through Mexico, and is distinguished from the eastern species by somewhat larger spores of all kinds, and by teleutospores more inclined toward clavate, paler, and with persistent pedicels. The South American *P. Chileana* may belong with the number following, but unquestionably does not belong here.

No. 290. PUCCINIA XYLORRHIZAE Arth. Since the publication of this species, collections have been received from other stations in Wyoming, one of which from Yellowstone Park, Aug. 30, 1899, No. 6780 (Aven Nelson), was distributed as *P. Asteris*, on *Aster* sp. Another collection on the same host was made by T. D. A. Cockerell, Sept. 24, 1902, at Las Vegas, N. M., and sent out as on *Senecio* sp. The colorless cells found in the sorus, which I at first called pseudospores, I now believe to be remnants of a peridium. Many species produce teleutospores within the aecidial cup, from the same mycelial mass that gave rise to the aecidiospores, and I see no objection to the view that in this species the aecidial stage is represented by a few loose peridial cells, and the uredinal stage by a few loose uredospores.

No. 459. PUCCINIA SALVIAE-LANCEOLATAE Bub., is a synonym of *P. caulincola* T. & G., as the authors have pointed out in the appendix.

No. 504. PUCCINIA DICHONDRAE Mont. occurs in southern California, where it was collected at San Diego, March 9, 1882, by M. E. Jones, No. 3040, and in Orange Co., May, 1903, by S. S. Parish, No. 4808. It has also been reported from Mississippi, by Tracy and Earle (Bull. Miss. Exper. Sta. No. 34:85. 1895).

No. 525. PUCCINIA PHILIBERTIAE E. & E. is a synonym of *P. Gonolobi* Rav., as a recent examination by the writer of the type specimen in the herbarium of the N. Y. Botanical Garden has clearly proved.

No. 529. PUCCINIA COMPACTA Kze. also occurs in Porto Rico, W. I. A collection made by A. A. Heller at Aibonito, P. R., March 22, 1899, on *Asclepias curassavica* L., No. 863, was determined by Ellis as *P. concrescens* E. & E., a name I have been unable to trace. Part of this collection sent to Dr. Bubák was compared with type material and pronounced identical with *P. compacta*.

No. 539. PUCCINIA HALENIAE A. & H. has been found in Wyoming on *Gentiana calycosa* Griseb.

No. 588. PUCCINIA CYMOPTERI D. & H. is undoubtedly a synonym of *P. Jonesii* Pk.

No. 595. PUCCINIA ASPERIOR E. & E. is also a synonym of *P. Jonesii* Pk. The two hosts cited, *Ferula dissoluta* and *Leptotaenia dissecta*, both refer to the same species, the former name being a synonym of the latter. Another host, *Ferula multifida*, cited under *P. Jonesii*, should be written *Leptotaenia multifida*.

No. 634. PUCCINIA MICROICA Ellis, was founded upon an erroneously determined host. The type is unquestionably *Cryptotaenia Canadensis*, and the name becomes a synonym of *P. Cryptotaeniae* Pk.

No. 639. PUCCINIA LINDROTHII Syd. is an undoubted synonym of *P. Jonesii* Pk.

No. 640. PUCCINIA SPHALEROCONDRA Lindr. is another synonym of the very abundant and very variable species *P. Jonesii* Pk. This species also occurs on more than a half dozen species of hosts not reported by Sydow. *Aecidium Leptotaeniae* Lindr. is a synonym not mentioned by Sydow.

No. 652. PUCCINIA SCANDICA Johans. has been collected in Utah at 8900 ft. alt., Aug. 16, 1903, by A. O. Garrett, No. 292, on *Epilobium* sp.

No. 992. PUCCINIA THOMPSONII Hume, is a synonym of *P. Bolleyana* Sacc., or what is the more correct name *P. Sambuci* (Schw.) Arth. This connection has been proven by cultures carried out by Prof. Kellerman.

No. 1064. PUCCINIA OMNIVORA E. & E. is a synonym of *P. Windsoriae* Schw. The host was erroneously determined it being in reality *Tricuspis seslerioides*.

No. 1071. PUCCINIA PROCERA D. & H. is founded on the same species of host, *Elymus condensatus*, as *P. montanensis* Ellis. The former was published in December, 1893, and is clearly a synonym of the latter, which was published in May, 1893. It is probable that neither of these names covers the rust on *Elymus Canadensis* and similar hosts occurring east of the Rocky mountains. Culture experiments have shown that the form on *Elymus Virginicus* has its aecidium on *Impatiens*, and possibly that on *E. striatus*, but not the form on *E. Canadensis*, whose affinities are not at present known.

No. 1086. PUCCINIA MELICAE (Erikss.) Syd. occurs in abundance in the vicinity of Lafayette, Ind., on *Melica diffusa* Pursh. As in Europe, the uredospores are formed in the greatest abundance, but the teleutospores only appear very late in the season.

No. 1087. PUCCINIA MILII Erikss. has been recently reported by Dr. J. J. Davis from Wisconsin. It was found in the uredoform in Vilas Co., Wis., July 11, 1901, on *Oryzopsis asperifolia* Minchx., but it was not until teleutospores were obtained, Sept. 30, 1903, that the determination of the species could be made. It was also gathered by the same collector at Racine, Wis., Aug. 8, 1903, on *Melium effusum* L., showing only the uredo. The American material agrees perfectly with the European, especially with Eriksson's No. 450 in his *Fungi parasitica scandinavici*.

No. 1101. PUCCINIA ESCLAVENSIS D. & H. should be written *P. eslavensis*, there being a clerical error in the original publication. The name is derived from Eslava (not Esclava), the place where the type collection was made.

No. 1147. PUCCINIA STIPAE Arth. is entirely distinct from the European form on *Stipa*, as cultures not yet published have abundantly demonstrated. The names used by Opiz and Hora do not, therefore, apply to the American species, and indeed, are not applicable to the European species, because they are both *nomina nuda*.

No. 1150. PUCCINIA SUBSTERILIS E. & E. is a synonym of *P. Stipae* Arth., for the so-called uredospores are the resting form, or amphispores, of that species.

No. 1157. PUCCINIA AGROPYRI E. & E. Aecidia of this species are known to occur in North America upon *Clematis ligusticifolia* in Colorado, Montana, Wyoming and Nebraska, on *C. Scottii* in Colorado, on *C. lasiantha* in California, on *Fremontii* in Kansas, on *C. Drummondii* in Arizona, and on *C. Viorna* in Iowa. The forms on *C. Virginiana* and *C. Douglasii* do not be-

long with this species. The first name in the Sydow list, *C. angustifolia*, is a clerical error for *C. ligusticifolia*.

No. 1218. PUCCINIA BAKERIANA Arth. is a synonym of *P. Ellisii* De T., and the host is not a species of *Heracleum*, but *Angelica tomentosa*. The error in determination of the host was pointed out by the collector, after publication. Errors like this would not be so frequent if collectors would make more liberal packets, and especially be careful to include whole leaves, parts of stems, inflorescence, etc., so that the mycologist may have some material on which to found a judgment regarding the host as well as the fungus.

In the above notes it has been the attempt to include matters of fact only, and not to introduce questions of opinion or matters not yet fully established. In order to keep this article within reasonable limits, most of the data upon which the statements are based, have been omitted, but it may be assumed that in every instance proof could be supplied by the writer that would meet the approval of Dr. Sydow and other mycologists.

AGARICUS AMYGDALINUS M.A.C.

EDWARD READ MEMMINGER.

As far as our research shows, *Agaricus amygdalinus* has never been technically described, and the first appearance of the name in print was in Curtis's List of the Fungi in the Geological and Natural History Survey of North Carolina published in 1867. It is not surprising, therefore, that so little being known about this species, even its existence has been questioned.

Dr. Farlow, in an interesting paper, entitled "Notes on *Agaricus Amygdalinus*, M. A. Curtis," published in the Proceedings of the Boston Society of Natural History, Vol. 26, has brought together all the known facts, and to this paper we wish to acknowledge our indebtedness for much that follows. It is our intention, in this paper, to review these facts, and to introduce others that lead us to the opinion that the plant, named *Agaricus amygdalinus* by Curtis, still grows in the Southern States, and is, perhaps, entitled to specific recognition.

We think it susceptible of proof, that this plant was first published by Curtis as *Agaricus fabaceus* Berk., then this determination not proving satisfactory, it was united by Ravenel with *Ag. campestris* Linn.; dissatisfaction still existing it was finally segregated as *Agaricus amygdalinus* by Curtis.

Its first appearance and publication as *Agaricus fabaceus* Berk. was in Silliman's Journal, Vol. 8, 2d Ser., p. 401. "Agar-

icus Fabaceus Berk.! Ad terram pinguem. July-Nov. Santa Canal. Rav. and Society Hill. First discovered in Ohio by Mr. Lea. This is among the most delicious species for the table. The fresh specimen has a distinct taste and odor of peach kernels or bitter almonds, which are nearly lost in being cooked."

It will be noted that in Berkeley's description of *Agaricus fabaceus* it is said that "when young it has a peculiar but not unpleasant smell." Berkeley's descriptions was published in Hooker's Journal of Botany in 1848; one year after Curtis's article in Silliman's Journal, above quoted, appeared.

Ravenel, a co-worker with Curtis, and from whom Curtis had received specimens of this plant, seems at first to have accepted this determination of this plant, for we find him writing as follows in the Charleston Med. Jour., Vol. 6, p. 190, 1851.

"No. 36. Psaliota Campestris. Linn. Aut. roadsides and green lawns.

"37. Psaliota fabaceus. Berk. All Summer and Autumn on the earth in fields and gardens. Gregarious. This is the species commonly known as the 'Eatable Mushroom.' It bears a strong resemblance to *Agaricus Campestris*, the common Eatable Mushroom of Europe, the Champignon of the Paris Epicures, and most probably has been brought into use in this country by those who are familiar with the other in Europe. The *Agaricus Campestris* is more rare and both are used indiscriminately. The *Agaricus fabaceus* may always be known by its emitting an odor of almond and peach kernel when fractured."

As time passed, and with further study in the field, Ravenel seems also to have experienced doubts as to the true position of this plant, and we find him, in an address before the Aiken Vine Growing Association published in the Charleston Daily Courier of Aug. 15th, 1862, entitled, "On the Edible Mushrooms of this Country," describing the Amygdaline plant under the name of *Agaricus campestris*. This address was of course very popular in form and substance; but it shows that he shared Curtis's doubts as to his previous determination of this plant.

Curtis finally settles the matter to his satisfaction in 1867, by creating the species *Agaricus amygdalinus*. The only description we have of this species is contained in a letter from Curtis to Berkeley Oct. 9, 1869, published in Gardner's Chronicle. The chief and only point on which he lays stress, and indeed the characteristic by which he separates this plant from its close allies, *Ag. arvensis* and *Ag. campestris*, is the strong Amygdaline odour and taste. "Indeed this may be regarded as the safest of all species for gathering, as it can be discriminated from all others even by a child or a blind person. Its taste and odour are so very like those of peach kernels or bitter almonds that almost invariably the resemblance is immediately mentioned by those who taste it crude for the first time."

This description, as far as it goes, agrees exactly with what was said of *Agaricus fabaceus* in Silliman's Jour. quoted above.

That the plant, finally described as *Agaricus amygdalinus*, is the same plant as the one formerly described as *Agaricus fabaceus* is proved, *first*, by the agreement of the two descriptions; *second*, by the facts mentioned by Dr. Farlow concerning the change made by Curtis of the labels in his copy of Ravenel's *Fungi Caroliniani Exsiccati*, to-wit:

"In this connection it is of interest to know that in Curtis's copy of Ravenel's *Fungi Caroliniani Exsiccati*, Vol. III, No. 3, is a specimen which, according to the label, is *Agaricus fabaceus* Berk. There is a note in Curtis's handwriting stating that this number is *Agaricus Amygdalinus* Curtis. Furthermore, in the Curtis Herbarium there are five specimens marked *Ag. amygdalinus*, viz.: '1248 in Arvis arenosis, June, Society Hill; 1236, in hortis et sylvis, May, 1849, Society Hill; 1045, rich soil in gardens, Nov. Santa Canal, Ravenel; 886, Sprague, Mass.' also two unnumbered specimens collected in Aug. and Sept., 1849. In the case of the first named specimen the name was originally written *Agarius Arvensis* and afterwards corrected to *Ag. Amygdalinus*. In the other cases the name first written was *Ag. fabaceus*, changed later to *Ag. Amygdalinus*."

Thirdly, that Curtis, after stating that *Ag. fabaceus* existed in North and South Carolina, entirely omits it from his list of Fungi of North Carolina, but places *Ag. amygdalinus* therein; and further, that in his letter to Berkeley, mentioned above, wherein he purports to give his experience with the eatble mushrooms of America, but seems to confine himself to his experience of the Carolinas, he makes no mention whatever of *Ag. fabaceus*, which, in 1849, he had said, was common, but describes at length *Ag. amygdalinus*.

Fourthly, that though Ravenel, in the article quoted above from the Charleston Med. Jour., states that *Ag. fabaceus* was the common Southern edible mushroom, and more abundant than *Ag. Campestris*, yet, in his List of the Edible Fungi of South Carolina, published in "South Carolina; Resources," etc., 1883, *Ag. fabaceus* does not appear, though *Ag. Amygdalinus* is mentioned therein.

Thus it seems clear that *Ag. fabaceus*, as mentioned and described by Curtis in Silliman's Jour., in 1849, and *Ag. amygdalinus* M.A.C. are intended for one and the same plant; and that both Curtis and Ravenel at first inclined to the view that the amygdaline plant approached closely enough to Berkeley's description to be placed under it, but years after, upon further study, changed their opinion and segregated it as *Ag. amygdalinus* M.A.C.

As said before, so far as is known, Curtis never published a technical description of this species. However, in a fragmentary work of his in manuscript, entitled "Esculent Fungi," which through the courtesy of his son, Rev. C. J. Curtis, I have been permitted to see and make excerpts from, we are enabled to get a more definite idea of this species.

"Ag. Amygdalinus M. A. C. Peach-Kernel Mushroom.

"This is fortunately a species that can be determined without mistakes; it is equal in flavor to the best. Indeed, when cooked it cannot be distinguished from the Pink-Gill. (Some persons pronounce this inferior to the Pink Gill, and pretend that they can distinguish them when cooked. I doubt it. Dr. Warren thinks it superior.) It resembles that very much in appearance, and is easily mistaken for it; but its strong odour and taste of peach-kernels or bitter almonds will at once determine it from all others. When cooked this peculiar flavor is dissipated entirely. To those who are fond of Mushrooms in a crude state this will be superior to all others, leaving an exceedingly pleasant after-taste on the palate. This does not affect grassy lands so much as the preceding species [*Ag. Camp.*], but is most common in cultivated manure grounds, as in gardens, also about stables and in the borders of rich woods. It is from 2-8 in. broad in the cap, according to the richness and mellow-ness of the soil, with a stem 2-6 in. high gradually enlarged to the base. The colour is whitish or yellowish-white in smaller specimens. In larger ones it is somewhat rusty, with small fibrous patches of the skin which partially detaches from the cap in nearly concentric circles. The gills are white before coming flesh or pink coloured, then changing to brown and black. The veil is much thicker and heavier than in the other [*Ag. Camp.*], detaching itself from the margin of the cap, and falling down upon the stem, where it hangs like a collar for a day or two.

"Comes up in its proper places during Summer and Fall after rains."

Coloured plates of both forms — the large and the small — made by Rev. C. J. Curtis accompany this work.

As no one since Curtis and Ravenel seems ever to have found, in the Southern States, any plant approaching *Ag. amygdalinus* as before known, such great uncertainty surrounded the subject that C. W. Hyams, in his paper on Edible Mushrooms of North Carolina, is prompted to say rather paradoxically:

"This plant is listed by Curtis, but no description of it can be found, and it is a very doubtful species at best. I have found no plant in this state which could possibly be this one. It is therefore admitted entirely upon his authority."

For several years, the writer has had under observation and study a plant which agrees in every particular with Curtis's description, and the accompanying plate of the small form of *Ag. amygdalinus*; so that I am convinced that it is the same plant as the one known to Curtis. As it appears in this locality I would describe it as follows:

Pileus moist, convex, expanded, slightly umbonate, 4 cm. in diameter, yellow shading to cream, silky fibrillose becoming floccose squamu-lose, squamules yellow, umbo smooth deep yellow, margin extending beyond lamellæ and sometimes fringed with remains of veil; flesh thin 3-4 mm. thick at umbo becoming thin to margin; stripe 3½-4 cm. long, bulbous, curving, tapering upward, stuffed, yellow floccose below veil, smooth and silky above. Gills adnate to free, white then pink to brown, becoming chocolate-brown. Veil superior pendant, thick, persistent floccose externally. Spores elliptical apiculate 3.5 μ -4 μ x 4.5 μ -5 μ^1 dark brown in colour.

¹Note. For the above spore measurements I am indebted to Mrs. Flora Patterson of the Agricultural Department.

Rather solitary in rich woods near stables. Having strong odour and taste of peach kernels or bitter almonds, odour even observable from handling without fracture. Rare but appearing every summer. Sometimes the yellow squamules are removed in age by rains or when the pileus appears cream to white in colour and smooth. The large form of this species has never been found in this locality.

It is clear that Curtis and Ravenel considered the possession by a plant of such a distinctive taste and odour to be a sufficient characterization to entitle it to specific recognition. And, indeed, their view is not without precedent in our time, as no less an authority than Prof. Massee has seen fit, in his treatment of the genus *Russula* to abandon Fries' classification and adopt one based entirely upon taste; and in our country our greatest authority on the Agaricaceae, Dr. Peck, has, in several cases, made "taste" of commanding importance in separating closely related species, viz., *Russula ochrophylla* and *R. drimeia*. Further and similar confirmation could be drawn from the modern treatment of *Lactarius*.

Recent research, however, has brought to light the fact that we have, in *Psaliota*, a group of closely related species, all of which possess these two characteristics viz: *Agaricus subrufescens*, *Amygdalinus*, *variabilis*, *pusillus*, *cretaceus*, and perhaps *arvensis* according to McIlvaine; so, unless we are to place them all under *Ag. subrufescens*, it may be advisable to create a Section "Amygdalina" to cover this group of species.

Whether *Ag. amygdalinus*, as above described, is the same as *Ag. subrufescens* is an open question. The description given by Curtis of the large form, seems to point that way, but the small form though possessing the same taste and odour, may prove to be a different species.

Moreover, it would be interesting to know if *Ag. fabaceus* does really belong to the Amygdaline group as Dr. Farlow seems to intimate. Only those who have an opportunity to study this plant in its habitat can ascertain this fact. Prof. Morgan, our only authority on this point, in his Mycologic Flora of the Miami Valley, makes no mention of its taste and odour, and in response to an inquiry from the writer said, "I myself am not very sensitive to odours, and have not noticed it particularly in this Agaric. Odours to me are like tastes, rather difficult to characterize." From this it seems clear that if *Ag. fabaceus* has an amygdaline odour and taste it must be in a very modified degree, as the taste and odour of the plant, as it grows here, could escape no one.

Dr. Farlow, in his paper so often quoted, does not add to our knowledge by giving his personal observation. The only other mention, in botanical literature which we have found on this point, is in Poreher's Med. Pois. and Diet. properties of the Crypt. Plants of the U. S., wherein he says that "Mr. Ravenel informs

me that it [*Ag. fabaceus*] is an alliaceus' edible' mushroom. Whether Ravenel obtained this fact from personal observation does not appear.

From the foregoing it would seem that the geographical distribution of *Ag. amygdalinus* would be from Massachusetts to Texas. Its existence in the former state is proved by the fact that when Curtis identified Sprague's New England plant as *Ag. fabaceus* he had in view *Ag. fabaceus* as described and understood by him in his article in Silliman's Journal, which we have shown was his *Ag. Amygdalinus*; and also by the fact mentioned by Dr. Farlow, that the Sprague specimen in Curtis's Herbarium was subsequently changed by Curtis himself to *Ag. amygdalinus*. We therefore have no evidence whatever of the existence of *Ag. fabaceus*, as described by Berkeley, east of the Alleghanies. That *Ag. amygdalinus* exists in North and South Carolina we have ample evidence from Curtis and Ravenel. Featherman states in his Catalogue of Plants of Louisiana, that it exists near Baton Rouge. The authority for its extension to Texas is a note, in H. W. Ravenel's handwriting, on a dried specimen in the National Herbarium, labelled *Ag. amygdalinus* Curtis and collected by Ravenel in Texas in 1869. "*Ag. amygdalinus* Curtis. The eatable mushroom of the Atlantic States. Only one specimen found in good condition, but weather so damp it preserved badly. I send it to show it belongs to the Flora of Texas. April 19. Grassy pastures near Houston."

It would seem, then, that *Ag. amygdalinus* is a regular member of the Fungal Flora of the Atlantic and Gulf States, from Massachusetts to Texas; whereas, so far as now known, *Ag. fabaceus* belongs to the Ohio Valley.

A corollary to be drawn from the above conclusions is that the addition to Berkeley's description of *Ag. fabaceus* of an amygdaline taste and odour, upon the authority of Curtis, as McIlvaine has done in his One Thousand Fungi, is incorrect and misleading.

Until, therefore, it is conclusively proved that *Ag. amygdalinus* and *Ag. fabaceus* are one and the same species, it is proper to confine the description of *Ag. fabaceus* strictly to the words of Berkeley, and no argument for the identity of these species, based on similarity of taste and odour drawn from Curtis's statement in Silliman's Journal, above quoted, can have any weight or force.

**NEW GENERA OF FUNGI PUBLISHED SINCE THE
YEAR 1900, WITH CITATION AND ORIGINAL
DESCRIPTIONS.**

COMPILED BY W. A. KELLERMAN AND P. A. RICKER.

(Continued from page 250)

[Deuteromycetæ.]

MYXOLIBERTELLA v. Höhnel n. g. Melanconiaceæ. Annales Mycologici, 1:526. 10 Dec. 1903.

"Est *Libertella* vel *Myxosporium* cum sporulis filiformibus et oblongis (vel fusoideis) commixtis."

[Deuteromycetæ.]

NEOMICHELIA Penzig et Saccardo n. g. Dematiaceæ. Malpighia, 15:246. 1902.

"Bicolor. Hyphae caespitosae, simplices v. ramosae, subcontinuae, asperulo-denticulatae, laete coloratae. Conidia nigricantia, elliptico-oblonga 3-pluriseptata, denticulis inserta. Hyphis laete coloratis, conidiis vero nigricantibus genus mox dignoscendum."

[Deuteromycetæ.]

NIGROSPORA Zimmermann n. g. Melanconiaceæ. Centralblatt für Bakteriologie, Parasitkunde, u. Infektionskrankheiten, Zweite Abteilung, 8:220. 17 Feb. 1902.

"Mycel parasitisch im Blattgewebe. Conidienträger aus den Spaltöffnungen hervorbrechend, kurz, an der Spitze eine Conidie tragend. Conidien sehr dunkel gefärbt, kugelig, 1-zellig, mit einem hyalinen Membranring, der die Spitze des Conidienträgers umgibt, und einer ebenfalls hyalinen Membrankappe an der Oberseite der Conidien."

[Deuteromycetæ.]

NOMURAEA Maublanc n. g. Hyphomyceteæ. Bulletin de la Société Mycologique de France, 19:295. 31 July 1903.

"Hyphae steriles repentes, minutae, septatae, hyalinae; fertiles erecta, simplices breves, ramulos ovoideos verticillatim gerentes; conidia ovoidea, continua, pallida, summa ramulorum 4-5 breves catenulas formantia."

[Deuteromycetæ.]

OIDIOPSIS Scalia n. g. Hyphomycetes. Rendiconti del Congresso botanico di Palerma. May 1902.

"Mycelium endogenum, septatum; conidiophori simplices vel parce ramosi, e stromatibus exeuntis; conidia catenulata, cylindracea, conidio apicali sursum actuato-papillato, coeteris utrinque rotundato-truncatulis."

"Ab *Oospora* hyphis distinctis differt; *Oidio* omnino similis sed endophyta."

[Deuteromycetæ.]

PEDILOSPORA v. Höhnel n. g. Mucedineae. Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe, Wien, III:1047. 1902.

"Hyphis hyalinis, substilibus, repentibus, obsolete septatis, irregulariter ramosis, hinc inde in matricem penetrantibus; ramulis conidiigeris brevibus, crassiusculis, acutis, plerumque congestis, conidiis acrogenis, pluricellularibus, bilobato-furcatis, lobis parallelis, elongatis, contiguis."

[Deuteromycetæ.]

PELLIONELLA (Sacc. ut subg.) Saccardo n. g. Sphaeropsidaceae. [Diplodiella cardonia Flag. et Sacc.] Malpighia, 15:243. 1902.

"Perithecia subsuperficialia, subcarbonacea, in rostellum producta. Sporulae 1-septatae, fuligineae. Est *Diplodiella rostrata*."

[Deuteromycetæ.]

PHYLLOHENDERSONIA Fl. Tassi n. g. Sphaeropsidæ. Bullettino del Laboratorio ed Orto Botanico di Siena, 5:53. 1902.

"Perithecia lenticularia v. globoso-lenticularia v. globulosa, membranacea, maculicola; sporulae oblongae, minutae, 2-pluri-septatae, coloratae."

[Deuteromycetæ.]

PHYLLOSTICTELLA Fl. Tassi n. g. Sphaeropsidæ. Bullettino del Laboratorio ed Orto Botanico di Siena, 5:19. 1902.

"Perithecia epidermide velata, lenticularia, membranacea, poro pertusa, maculicula; sporulae ovoideae v. oblongae, continuae, coloratae. Genus *Phyllostictæ* analogum sed phaeospororum."

[Deuteromycetæ.]

PIROBASIDIUM v. Höhnel n. g. Hyalostilbeæ. Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe, Wien, III:1001. 1902.

"Stromate compacto, stipitato-capitato vel clavato, stipite e hyphis brunneis vel pallidis, plectenchymaticis, ramosis, coalitis composito; capitulo carnososo-gelatinoso, e hyphis radiantibus, iterum verticillato-ramosis, dense condensatis, denique gelatinose confluentibus formato, ramulis ultimis e cellulis subglobosis constantibus, basidiis 3-5, obpyriformibus, connatis coronatis; conidiis ex apice basidiorum singulatim orientibus, minutissimis, hyalinis, bacilliformibus, parallele denseque stipatis, dein mucedine obvolutis."

"Est status conidiophorus Corynes Bulgariacearum."

[Deuteromycetæ.]

PLECTOTHRIX Shear n. g. Hyphomycetes. Bulletin of the Torrey Botanical Club, 29:457. July 1902.

"Sterile hyphae creeping, scanty; fertile, erect scattered with more or less irregularly arranged spinose branches near the apex; conidia globose, hyaline, borne singly on the tips of the branches."

"This appears most nearly related to the genus *Monosporium* Bon., as treated by Saccardo, but differs in the much simpler fertile hyphae with the peculiar spur-like branches, to which the name refers. The type of the genus is *Plectothrix globosa* sp. nov."

[Deuteromycetæ.]

PRITZELIELLA P. Hennings n. g. *Hyalostibaceae*. Beiblatt zur *Hedwigia*, 42:(88). März 1902.

"Stromata stipitato-capitulata vel subclavata, simplicia, haud ramosa, hyphis coalitis hyalinis conflata. Conidia catenulata, sub-globosa, hyalina. Coremio affin. sed apice haud ramosa."

[Deuteromycetæ.]

PSEUDOBELTRANIA P. Hennings n. g. *Dematiaceae*. *Hedwigia*, 41:310. 15 Dec. 1902.

"Hyphae erectae, ramosae, plurime septatae, inflatae, fuscidulae. Conidia acrogena solitaria vel plurima, rhomboidea haud rostrata, medio 1-septata, fuliginea.

"Von Beltrania durch das Fehlen der Setulae, durch die Verzweigung der Hyphen und die nicht geschnäbelten Conidien verschieden."

[Deuteromycetæ.]

PSEUDOMELASMIA P. Hennings n. g. *Leptostromataceæ*. *Hedwigia*, 41:115. 23 Juni 1902.

"Stroma effusum membranaceo-crustaceum, atrum; perithecia immersa, rotundata, plana rimosa. Conidia oblonga, hyalina, septata. Melasmiae affin. sed conidia 1-septata."

* *PSEUDOZYTHIA* v. Höhnel n. g. *Nectrioidaceæ*. Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe, Wien, 111:1019. 1902.

"Pycnidii superficialibus, sparsis, pallidis, carnosis, submolibus, globosis, e fibris, exakte parallele condensatis formati primum clausis, denique late apertis, in margine subciliatis; sporophoris subtilibus, longe ramosis; sporulis pleurogenis, cylindraceo-fusiformibus, hyalinis, unicellularibus. Planta saprophytica.

"Diese neue Gattung kann nur bei den *Nectrioidaceæ-Olluleæ* eingereiht werden. Am nächsten stehen *Ollula* und *Cyphina* (Saccardo, Sylloge X, p. 411 od. III, p. 623), doch ist weder die eine, noch die andere dieser Gattungen näher verwandt. Höchst charakteristisch ist das Gehäuse, das aus mehreren Lagen paralleler Hyphen besteht, am Rande in Cilien ausgehend. Die Sporenträger sind im unteren Theile lang verzweigt, fädig und tragen seitlich die fast spindelförmigen hyalinen Sporen."

[Deuteromycetæ.]

RHOMBOSTILBELLA Zimmermann n. g. *Stilbaceæ*. Centralblatt für Bakteriologie, Parasitenkunde und. Intektionskrankheiten, Zweite Abteilung, 8:221. 17 Feb. 1902.

"Fruchtträger stilbumartig, aber die Conidien nicht von Schleim umgeben und doppelkegelförmig, an beiden Enden zugespitzt."

[Deuteromycetæ.]

RICCOA Cavara n. g. Hyphomycetes? *Annales Mycologici*, I:44. Jan. 1903.

"Stroma stipitato-capitatum, firmum, basi hyphis radiantibus, matrici adpressis instructum; stipes celluloso-parenchymaticus tenax, intus lacunosus, sursum in discum sporophorum elatus atque tenui membrana mox fatiscente obstectus; sporophori deorsum laxe intricati et pro parte fusi, dein liberi, exigui, filamentosi, simplices, continui; sporae pleurogenae, pluriseriatae haud catenulatae."

[Deuteromycetæ]

SCAPHIDIUM Clements n. g. Excipulaceæ. *Botanical Survey of Nebraska*, 5:5. 30 March 1901.

"Apopycnidium oblong or linear-disciform, at length hysteroid, waxy-membranaceous, dark brown; basidia simple; sporia uniseptate, hyaline, fusoid. Corresponds to Sporonema in the Hyalodidymæ."

[Deuteromycetæ.]

SCHIZOTRICHUM McAlpine n. g. Tuberculariæ. *Proceedings of the Linnean Society of New South Wales*, 28:562. 1903.

"Sporodochia globose or subglobose, erumpent, ultimately superficial, black; setæ septate, thick-walled, erect, straight or slightly curved, few or numerous, conidiophores obsolete or represented by a minute colourless base. Conidia hyaline, filiform, straight or curved, 3 or more septate.

"This genus has a dark coloured sporodochium, but the conidia are hyaline, hence it belongs to the Series *Tuberculariæ Mucedinæ*, Sacc. Further, on account of the septate spores, it will occupy a place beside *Leptotrichum* Corda, in which the conidia are only 1-septate and the setæ continuous."

[Deuteromycetæ.]

SEPTOTRULLULA v. Höhnel n. g. Melanconieæ. *Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe*, Wien, III:1025. 1902.

"Acervulis perithecio parentibus vel disciformibus vel pulviniformibus, erumpentibus, fuliginosis; strato proliger basali, tenui, minute celluloso, basidiis cylindraceis, arcte stipatis obtecto; basidiis apice in articulos (conidia) cylindraceos, catenulatos, uterinque truncatos, dense et parallele stipatos, transverse septatos, dilabentibus."

"Diese neue Gattung ist charakterisiert durch ein dünnes, kleinzelliges, dunkelbraunes Stroma, das aussen allmählich verläuft und an seiner Oberseite cylindrische, steife, parallele, nicht verzweigte braune oder blasser, septierte Basidien entwickelt, die eine compacte Masse bilden und oben in dicht gelagerte, cylind-

drische, septierte Conidien zerfallen. Eine Hülle fehlt vollständig, die Entwicklung der Acervuli erfolgt in den äussersten Gewebsschichten — bei den beiden beschriebenen Arten im Periderm — und bricht der Fruchtkörper sehr bald durch und wird frei."

[Deuteromycetæ.]

SIROPATELLA v. Höhnel n. g. *Excipulaceæ*. *Annales Mycologici*, 1:401. 30 Sept. 1903.

"*Pycnidia globosa*, erumpenti-superficialia, carnosò-coriacea, nigra, primum clausa, demum irregulariter dehiscentia et late hiantia. Basidia dense stipata, simplicia, brevia. Conidia acrogena hyalina, didyma, catenulata."

[Deuteromycetæ.]

SPOROCYSTIS Morgan n. g. *Tuberculariaceæ*. *Journal of Mycology*, 8:169. Dec. 1902.

"*Sporocystis condita* Morgan gen. & sp. nov.—Stroma large, subglobose, fleshy, white, with a mycelium of slender white filaments; the spores a dense superficial layer. The pellucid hyphae compacted into a soft parenchymatous tissue, rich in fatty globules; the spores borne on the more or less distinct extremities. Spores sub-globose, white, 50-70 mic. in diameter, each composed of many small spherical cells, 9-11 mic. in diameter.

"Growing on old leaves in woods; Preston, Ohio, October 1902. The stromata usually scattered, 1-2 mm. in diameter, occasionally two or three confluent. The dry spore shows best the cells of which it is composed. The stroma, mycelium and spores all abound in oil-globules as in the *Entomophthoraceæ*; these are best exhibited in a drop of water."

[Deuteromycetæ.]

SPORODINIOPSIS v. Höhnel n. g. *Hyphomycetes*. *Annales Mycologici*, 1:528. 10 Dec. 1903.

"*Hyphae pallide vel hyalinæ, septatæ, steriles repentes, fertiles erectæ, repetito dichotome ramosæ; ramulis ultimis ad apicem vix incrassatis; conidiis numerosis, hyalinis vel subhyalinis, ovatis, continuis, in capitulum aggregatis, inuco conglutinatis.*"

[Deuteromycetæ.]

STACHYBOTRYELLA Ell. & Barthol. n. g. *Hyphomycetes*. *Journal of Mycology*, 8:177. Dec. 1902.

"Differs from *Stachybotrys* in its paler color, creeping habit and absence of any perceptible basidia, the conidia arising directly from the slightly swollen, minutely roughened apex of the fertile hyphae."

[Deuteromycetæ.]

STAGONOSPORELLA Fl. Tassi n. g. *Sphaeropsidæ*. *Bullettino del Laboratorio ed Orto Botanico di Siena*, 5:50. 1902.

"*Perithecia globoso-lenticularia, epidermide velata, maculicola; sporulæ cylindraceæ, typice 3-septatæ, hyalinæ.*'

[Deuteromycetæ.]

STAGONOSPORINA Fl. Tassi n. g. Sphæropsidæ. Bullettino del Laboratorio ed Orto Botanico di Siena, 5:51. 1902.

"Perithecia globosa v. depressa, erumpentia, membranacea v. subcarbonacea; sporulæ ellipsoideæ v. cylindraceæ, minutæ, 2-pluriseptatae, saepius guttatæ, hyalinæ."

[Deuteromycetæ.]

STEMPHYLIOPSIS A. L. Smith n. g. Dematiæ. Journal of the Royal Microscopical Society, 1901:617. Dec. 1901.

"Hyphæ intricately branched, colourless, septate; spores terminal on the branches, elliptical or subglobose, 2-many-septate and muriform, colourless."

[Deuteromycetæ.]

STRASSERIA Bresadola et Saccardo n. g. Sphaerioidaceæ. Verhandlungen der k. k. zoologisch-botanischen Gesellschaft in Wien, 52:436. 1902.

"Perithecia innato-emergentia, subgloboso-conica, carbonacea, ostiolo punctiformi aperta; sporulæ cylindraceæ, continuæ, chlorino-hyalinæ, subsessiles, sub apice setulâ longa, filiformi, obliquâ præditæ."

"A genere Neottiospora differt sporulis 1-ciliatis. Inter Sphaerioidaceas occupabit n. 253. Conf. Sacc., Syll. XIV., p. 40."

[Deuteromycetæ.]

TETRACRIUM P. Hennings n. g. Mucedineæ. Hedwigia, 41:116. 23 June 1902.

Hyphæ steriles repentes, hyalinæ, septatae; hyphæ fertiles erectæ brevissimæ, continuæ. Conidia acrogena, quadriradiata, elongato-fusoidea, pluriseptata, hyalina. Prismeriaæ et Trinacrio affin."

[Deuteromycetæ.]

TORULOPSIS Oudemans n. g. Dematiæ. Ned. Kr. Arch. 3e Ser. II. 4. 7. 917. 1903.

"Parmi les genres de Dématiées Amérosporées macronémées à conidies caténulées, citées par Mr. Saccardo aux pages 236 et 237 du vol. IV. du Sylloge, on n'en recontre aucun dont les hyphes fertiles (dressées), absolument hyalines, tranchent d'une manière frappante sur les conidies très foncées. Ceci nous déclina à créer le genre *Torulopsis*, se distinguant des espèces de *Torula* par ses hyphes fertiles dûment développées et contrastant nettement avec les conidies sombres qu'elles produisent."

[Deuteromycetæ.]

TRICHOBOTRYS Penzig et Saccardo n. g. Dematiaceæ. Malpighia, 15:245. 1902.

"Hyphæ confertæ caespitosæ, filiformes, indivisæ, parce septatae, fuligineaæ, hinc inde sed remitissime glomerulos condidorum brevissime stipitatos exerentes. Conidia globulosa, continua, fuliginea. Ob habitum et ob conditorum dispositionem (statum

conidicum *Ascotrichae simulantem*) verisimiliter etiam genus hos ad *Ascotrichae* v. *Chaetomii* cujusdam cyclum pertinet."

TRICHOCOLLONEMA v. Höhnel n. g. Sphaeropsidæ. Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe, Wien, III:1015. 1902.

"Pycnidiis superficialibus, subglobosis, carbonaceis, pilis longis, saepe conidiigeris instructis; sporulis longis, fusiformibus, coloratis, septatis.

"Est *Collonema piligera* cum sporulis septatis, coloratis.

"Diese neue Gattung gehört zu den *Sphaeropsidaceæ-Scolecosporeæ* und ist am meisten mit *Trichoseptoria*, *Collonema* und *Septorella* verwandt. Von *Trichoseptoria* unterscheidet sie sich durch die oberflächlichen Pycnidien und die gefärbten, lang spindeförmigen Sporen. Von *Collonema* trennt sie die Bahaarung der Gehäuse, die Septierung und Färbung der Sporen. Während *Septorella* durch die kahlen Pycnidien und die nicht septierten, farblosen Sporen verschieden ist."

[Deuteromycetæ.]

UROHENDERSONIA Spegazzini n. g. Sphaeropsidæ. Anales del Museo nacional de Buenos Aires, series III, 8:84. 1902.

"Char. Perithecia lenticularia atra ostiolata erumpentia pusilla glabra; sporulæ pluriseptatæ fusculæ e stipite filiformi hyalino apice incurvo pendulæ, dein libere stipite persistente caudataæ."

[Deuteromycetæ.]

VOLUTINA Penzig et Saccardo n. g. Tuberculariaceæ. Malpighia, 15:257. 1902.

"Sporodochia obconico-hemisphærica, superficialia, læte colorata, setis pallidis hirta. Hyphæ sporodochii dense verticaliter stipatae et in strata subhorizontalia dispositæ. Sporophora bacillaria simplicia. Conidia cylindracea, catenulata, continua, hyalina. Habitus omnino *Volutellæ*, sed conidia catenulata et hyphæ thalamii stratosæ (semper?)."

[Deuteromycetæ.]

XENOPUS Penzig et Saccardo n. g. Mucedinaceæ. Malpighia, 15:240. 1902.

"Hyphæ steriles obsoletæ, fertiles erectæ, simplices, v. ima basi junctæ, continuae, pallidæ, ubique verruculosæ, apice v. prope apicem spicula pauca conidiophora gerentes. Conidia globosa v. ellipsoidea, solitaria, continua, hyalina. Rhinotricho accedit, sed præprimis hyphis ubique verrucosis apice spiculigeris dignoscitur."

[Deuteromycetæ.]

XENOSPORIUM Penzig et Saccardo n. g. Dematiaceæ. Malpighia, 15:248. 1902.

"*Hyphæ steriles repentes, septatæ, fuligineæ, hinc inde sporophora brevia exserentes. Conidia magna, erecta, subreniformia, distincte compressa, atronitida, duriuscula, clathrato-septata, latere concavo inæqualiter sinuosa, latere convexo levia.* È superficie conidiorum exseruntur conidiola secundi ordinis globosa, continua, fuliginea.—Genus omino mirificum et cum nullo noto comparandum. Sub vitro fortiori conidia videntur disculi verticales atro-nitidi, valde approximati. Quid conidiola fungantur, in vivo inquirendum."

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UREDINEOUS INFECTION EXPERIMENTS IN 1904.²

W. A. KELLERMAN.

The results of inoculation experiments here recorded constitute the third report of work in consecutive seasons with various species of Uredineæ. It has proved advantageous as in the previous years to attempt inoculations long in advance of the normal season for some of the species used. Not only repeated inoculations are possible the same season, thus at once removing possible doubt which is likely to arise in case of some of the successful inoculations, but this pre-season work insures non-contamination or avoidance of accidental infection, that might not be vouchsafed in case spores are in the air outside the greenhouse, the wide distribution of which in the proper season should of course always be suspected.

If testimony relative to the proposition just suggested were needed, the case of the Maize Rust related in detail below could be cited. Here the work of inoculation was begun in the middle of the winter (Jan. 16) and the successful inoculation was the starting point for an extended series of inoculations on different agricultural varieties of Maize and some other plants. When later work by another Uredinist was published which threw a shadow of doubt on some of the results, it was possible — then late in the season — to repeat the precise experiment alluded to and certainty was thereby restored. The work in detail will now be given.

(¹) Contributions from the Botanical Laboratory of the Ohio State University, XVIII.

MAIZE RUST — PUCCINIA SORGHI Schweinitz.

Inoculations with *Puccinia sorghi* were begun Jan. 16, 1904. Maize plants three to six inches grown in the greenhouse were used as hosts. The teleutospores were secured from infected Sweet Corn of the previous season, which had remained in the field all winter. The infections were tardy in bringing results, doubtless due in the main, to the unfavorable environment of the host plants; by this is meant that the quantity of light daily is much less than during the normal growing season in our latitude because of short days and much smoke and cloudiness in the atmosphere; and, besides, illumined as a greenhouse ordinarily is, a considerable quantity of solar light is excluded by the glass.

In the first experiment, Jan. 16, 1904, (No. 261), Sweet Corn being used as the host, a well developed uredospore sorus was discovered on the under side of one of the leaves Feb. 10, but which must have appeared several days previous.

A second inoculation with the teleutosporic material from the Sweet Corn as in the first inoculation, which was made Jan. 22 (Expt. 262) produced several pustules of uredospores which were noticed and recorded Feb. 16. Some of the sori seemed to be perhaps three days old and others were barely rupturing the epidermis; they were a bright golden color, and it was a most enchanting sight. As late as March 13 uredo-sori were found rupturing the epidermis of other host plants in the same pots and it is believed that they were also the result of the artificial inoculation with teleutospores and not from uredospores on the neighboring plants.

Careful search was made continuously for the possible appearance of spermogonia but here nor throughout the season could the slightest indication of such structures be detected. The appearance of uredospores following directly the sowing of teleutospores led to the conviction — corroborated by later experiments — that the spermogonia and aecidia are not, at least in some cases, included in the cycle of development. The inoculation having been successful in mid-winter excluded even the slightest probability that accidental infection by aecidiospores or even uredospores had obtained.

Uredospores obtained in the first experiment, where teleutospores from Sweet Corn in the field, sowed on Sweet Corn as the host, were used to inoculate Pop Corn (Expt. 280) March 30; at the same time other Sweet Corn plants were inoculated with like material. Uredospores appeared on both hosts April 11th. Here as in most cases throughout the season teleutospores on the same leaves (different sori) appeared later.

Common field corn, that is, Dent Corn, was inoculated April 20 with uredospores from the Sweet Corn. Uredo sori appeared

May 12th on the plants three or four inches high but the stalks fifteen inches high did not exhibit inoculation.

Uredospores from the Dent Corn were then used on Dent Corn both white and yellow, also on Sweet Corn and on Pop Corn (Expts. 294, 295, 296, 306, 308, 323, 324, 325, 356, 384). In all cases success attended the inoculations. It was evident by this time that we had scarcely to think of a probability of "biological" forms or varieties seeing that in case of at least three of the so-called "agricultural species" of Maize there was no invulnerability to one and the *same individual Rust-plant*, if the expression be allowed.

Effort was then made to secure all of the "agricultural species" of maize and attempt inoculations using uredospores of the several kinds of host plants now available. Several repetitions of previously outlined combinations were successfully made (Expts. 292, etc.)

On May 15th uredospores which had been harvested on yellow Dent Corn (these having been obtained by sowing the uredospores from Sweet Corn that were the result of inoculation with the teleutospores from Sweet Corn plants of the previous season, were sown on young Pod Corn plants, (Expt. 355). Sori of uredospores followed May 23. This experiment was repeated with success May 22-29 (Expt. 383).

On the same date (May 15) uredospores (of the same pedigree as those mentioned in the preceding paragraph) were sown on small plants of Flour Corn and on corresponding date, viz., May 23, uredo pustules appeared, (Expt. 357). Repetition of such inoculation was successful, date June 4-15.

For the sake of zeian chronological consistency it may be stated here that on date now mentioned, May 15, teleutospores from Sweet Corn (same as used in first experiment) were sown on Dent Corn and on May 28 uredosori appeared, (Expt. 361). This result is a confirmation of the previous conclusion (result of Expt. 261), namely, that two spore producing stages only are included in the Maize Rust life cycle — based, however, it must be remembered, on two tests only!

Again, using the uredospores obtained by the first inoculation experiments of the season, this time the host being Flint Corn, abundant success followed. In fact from this time on, many plants of Flint Corn, as well as the other kinds used as hosts, became inoculated when placed in close proximity to plants well infected by previous experiments.

It may be stated that uredospore-formation continued as long as the host-plant grew thriftily. But when the latter declined so that the leaves began to turn yellow, pustules of teleutospores appeared.

NO BIOLOGICAL SPECIES OF PUCCINIA SORGHI.

It will be noted that the six so-called "agricultural species" of Maize, namely *Zea everta* (or Pop Corn), *Zea indurata* (Flint Corn), *Zea amyacea* (Soft or Flour Corn), *Zea saccharata* (Sweet Corn), *Zea indentata* (Dent Corn), and *Zea tunicata* (Pod Corn) were used as hosts and with equally successful results. The teleutospores and uredospores were applied as detailed above. The conclusion seems to be warranted that there are no "biologic" species in case of the Maize Rust known as *Puccinia sorghi* Schw.

A NEW HOST FOR PUCCINIA SORGHI.

Seeds of Teosinte, *Euchlæna luxurians*, were furnished me by the U. S. Department of Agriculture and thirty young plants were soon available for purposes of inoculation. Using the uredospores obtained by an early inoculation of the season, making the sowings May 15, good infection was exhibited May 24, an abundance of uredospores present at that date. Another infection was made June 4 on this species as host and on June 15 a uredo pustule appeared. So far as I am aware this host has not heretofore appeared in literature.

UNSUCCESSFUL RESULTS ON OTHER HOSTS.

When Schweinitz published his description of *Puccinia sorghi* he said as to its occurrence: "frequens in foliis Sorghi et Zeæ." Under apparently favorable circumstances many inoculations were attempted with *Sorghum vulgare*, *Saccharum officinarum* and *Tripsacum dactyloides*, all of which were unsuccessful.

Roots of *Tripsacum* were removed to the greenhouse very early in the spring and numerous vigorous plants were available for the inoculations May 15 and on later dates (Expts. 354, 365, 380, 391, 396, 400, 405), but in no case were the efforts rewarded with success though uredospores were used from sori which furnished the inoculating material for the successful inoculation on Maize plants.

Seedlings of *Sorghum vulgare*, both common *Sorghum* and Broom Corn, were inoculated with tested uredospores and yet all the attempts failed. It appears that this host when grown in the greenhouse is invulnerable to *Puccinia sorghi* from Maize (Expts. 359, 360, 362, 397, 399, 403, and 404).

A living plant of Sugar Cane, *Saccharum officinarum*, was kindly sent me from Mississippi by Prof. S. M. Tracy. After recovery from the shock of transplanting, inoculation with uredospores similar to material used in previously successful cultures was not successful.

IS AN AECIDIUM SUPPRESSED?

An article appeared in the Botanical Gazette, 38:64-67, July 1904, entitled The Aecidium of Maize Rust, by J. C. Arthur, in which it is shown experimentally that aeciospores from *Oxalis cymosa* Small placed on leaves of Maize plants produce uredospores. The following may be quoted from this author: "This prompt and very abundant appearance of the uredo could be interpreted only as the result of the aecidial infection, for corn rust had not yet appeared out of doors, and even if it had, such an unusual attack following closely within the time limit of incubation would be highly improbable. It may therefore be considered proved that the aecidium of *Puccinia Sorghi* Schw. occurs upon *Oxalis*, and a verification with teleutosporic material can be confidently undertaken in due time."

This result suggested that in spite of two successful inoculations with teleutospores of Maize Rust resulting in the production of uredospores (Expts. 261, 361), a mistake may have been made. Therefore a third infection experiment was undertaken July 15. Precaution was taken to grow and keep the host plants in a section of the greenhouse far removed from that portion in which the former experiments were carried on, to obviate so far as possible any accidental infection. The usual precautions were taken in making the inoculation — teleutospores from Sween Corn grown in the field the previous season being used. After nine days a pustule of uredospores put in an appearance — and thus for the third time during the period of my inoculation work extending from Jan. 16 to July 15, uredospores followed *directly* upon the application of teleutospores.

If these experiments can be relied on, we may say that while *Puccinia sorghi* Pers. is a heteroecious species (as proven by Dr. Arthur's experiment quoted above) it is able at times to suppress its aecidial stage. We may say besides — judging from the prevalence of the uredo and teleuto stages and the rarity of the aecidium, supposing the work of the two experimenters has really furnished results as recorded — that in the great corn growing belt of our country the aecidial stage is usually suppressed,

SUNFLOWER RUST — PUCCINIA HELIANTHI Schw.

In spite of an abundance of experimental work with *Puccinia helianthi* Schw. there is not a unanimity of opinion in reference to this common Rust. Whether there are two valid species, *P. helianthi* Schw. and *P. helianthorum* Schw., or only one; or whether there are several 'physiological species'; is not as yet agreed upon. Recent inoculation work leads me to think there is but one valid species and that there are no recognizable 'biologic' forms.

I was kindly furnished good teleutosporic material by Professor F. L. Stevens, collected at Raleigh, North Carolina, on

Helianthus tuberosus. Many plants of several species of *Helianthus* were used in the inoculations as the following account shows.

On Feb. 4, with spores from the Artichoke referred to in the preceding paragraph, the following host plant was inoculated: *Helianthus annuus* (Expt. 263, 264). Spermogonia appeared on March 1 and aecidia March 3. With similar teleutosporic material sowings were made April 11 on *Helianthus giganteus* (Expt. 282), *H. trachelii* folius (Expt. 283), *H. mollis* (Expt. 284), *H. maximiliani* (Expt. 285), *H. decapetalus* (Expt. 286), *H. grosse-serratus* (Expt. 287), *H. orgyalis* (Expt. 288), *H. kellermani* (Expt. 289), *H. annuus* (Expt. 290). Abundant spermogonia and aecidia appeared April 27 and 30 on the last named host only.

Teleutospores from *Helianthus grosse-serratus* furnished by Dr J. C. Arthur, Lafayette, Ind., were sown April 13 on the several hosts previously mentioned. Spermogonia and aecidia occurred only on the following hosts: *Helianthus annuus* (Expt. 297), *H. orgyalis* (Expt. 298), *H. trachei* folius (Expt. 299), *H. kellermani* (Expt. 300), *H. giganteus* (Expt. 302), *H. grosse-serratus* (Expt. 304), and *H. decapetalus* (Expt. 305). On May 17 *Helianthus tuberosus* (Artichoke) was inoculated—but dates and notes lost.

The above shows that Woronin's claim based on experiment that the Rust on *Helianthus tuberosus* was a different species (*Puccinia helianthorum* Schw.) from that on *Helianthus annuus* (*Puccinia helianthi* Schw.) was inaccurate. His statement as published in the Botanische Zeitung, 30:695-6, 27 Feb. 1872, is as follows:—"Endlich musste ich auch noch folgende Frage lösen: Ist die *Puccinia Helianthorum* Schw., welche Ravenel auf den Blättern der Erdbirne (*Helianthus tuberosa*) gefunden hat, eine selbständige Form, oder ist sie mit unserem Sonnenblumenrost (*Puccinia Helianthi*) identisch? Um diese Frage zu lösen, machte ich im Verlaufe zweier auf einander folgender Sommer (1869 und 1870) zahlreiche Aussaaten sowohl von *Aecidium*-Stylosporen, als auch von Uredo- und Teleutosporen der *Puccinia Helianthi* auf junge Blätter und auf ganze Pflanzen von *Helianthus tuberosus*. Das Resultat war wieder negativ; nicht ein einziges mal gelang es mir, die *Puccinia Helianthi* dem *Helianthus tuberosus* einzimpfen. Dasselbe Resultat, wie mir aus brieflichen Mittheilungen bekannt ist, erhielt auch Prof. de Bary. Folglich muss man vermuthen, dass die Ravenel'sche Form, die *Puccinia Helianthorum*, eine ganz andere ist, als unsere *Puccinia Helianthi*, welche sich auf *Helianthus annuus* entwickelt."

I would again call attention to the uncertainty of basing too sweeping conclusions on negative results. My work with *Puccinia helianthi* this year has not been successful in certain cases which alone might have led me to erroneous conclusions, but the

previous year these hosts responded to the inoculations! Moreover, I am ready to express the belief in view of all the work done on *Puccinia helianthi* by all the experimenters from Woronin down to the present, that there is but one species of Rust inhabiting the several species of *Helianthus*.

PINE RUST, PERIDERMIUM PINI.

Aecidiospores of *Peridermium pini* were obtained at Sugar Grove, Ohio, June 1st, and sowings made on *Campanula americana*. The plants used in the greenhouse—not being well established because of recent transference from the woods—succumbed before the normal time for appearance of any results of possible inoculation. Plants in a neighboring woods were therefore used without being removed from their natural habitat. Pustules of uredospores appeared June 8 on the leaves to which the aecidiospores were applied. The neighboring plants were free from uredo—careful search being made at the time and again at intervals later. It is therefore demonstrated that *Coleosporium campanulae* (Pers.) Lév. and *Peridermium pini* are alternate forms of one and the same species.

PUCCINIA THOMPSONII Hume.

Cultures were made with the teleutospores of this species from *Carex frankii* and the results were published in this JOURNAL, p. 173 (vol. 10), but for the sake of completeness of this report the account is here reproduced:

In default of guiding clues random cultures were made in 1903 with the teleutospores of *Puccinia thompsonii* Hume, a widely occurring rust on *Carex frankii*, but no success attended the attempted inoculations. Suspecting a possible connection with the Aecidium of the Elder, *Sambucus canadensis*, and noting the strong morphological resemblance between this species and the forms previously described as *Puccinia bolleyana* by Saccardo (1891) and *Puccinia atkinsoniana* by Dietel (1897),¹ attempted inoculations were renewed the present season.

Partially successful results were at first discredited in spite of the strong suspicion entertained that the alternate form would prove to be none other than Schweinitz's *Aecidium sambuci*. At this time I communicated my suspicion to Dr. Arthur, also asking for good culture material in case he had any to share with me. He kindly replied

¹ These were pronounced by Arthur to be one and the same species and the name *Puccinia sambuci* (Schw.) Arthur was applied. Cfr. Bot. Gaz. 35:15. Jan. 1903.

For convenience of reference the accepted name and synonymy may here be summarized.

PUCCINIA SAMBUCI (Schw.) Arthur. Bot. Gaz. 35:15. Jan. 1903.
Aecidium sambuci Schweinitz. Trans. Am. Phil. Soc. Philadelphia, 4:294. 1834.

Puccinia bolleyana Saccardo. Am. Mon. Micr. Jour. 10:1 (fig.) Aug. 1889. Sylloge Fungorum, 9:303 (descr.) 15 Sept. 1891.

Puccinia atkinsoniana Dietel. Bull. Bull. Cornell Univ. (Science), 3:19. June 1897.

Puccinia thompsonii Hume. Bot. Gaz. 29:352. May 1900.

at once, stating that he had entertained such an opinion for nearly two years as suggested above though he had no suitable teleutospores for inoculation.

I was fortunate enough to find a small quantity of the Rust that had been exposed all winter, in the vicinity of Columbus. Proceeding with great care, most satisfactory results were obtained in a few days, when several vigorous inoculated host plants of *Sambucus canadensis* were rendered fairly yellow with abundant spermogonia. [Expt. 326.] In the usual time the plants exhibited the characteristic Elder aecidia — even the infection of petioles and stems causing distortions resulted from the inoculations. The evidence could not be denied by the most skeptical and I can therefore with confidence assert that *Puccinia thompsonii* Hume is a synonym of *P. sambuci* (Schw.) Arthur.

It is interesting to note, after all, that the description given by H. Harold Hume in the Botanical Gazette, 29:352, May 1900, differs in no marked or striking degree from those of *P. bolleyana* and *P. atkinsoniana*. For example, the teleutospores are said to be "oblong clavate, 46-68 x 15-24 μ ," whereas in *P. bolleyana* they are given as clavate-oblong, 40-60 x 18-28 μ ." It is said [l. c.] that this species, *P. thompsonii*, "somewhat resembles *P. bolleyana* Sacc., but differs from it in the more scattered, larger, oblong, lighter-colored sori and the somewhat longer and narrower spores." Doubtless the slight discrepancies in the three descriptions are referable to conditions or phases of a temporary character or minor importance.

UNSUCCESSFUL EXPERIMENTS.

Other Rusts were tested as *Puccinia emaculata*, *P. osmorhizae*, *P. asparagi*, *P. curtipes*; Rusts from *Carex intumescens*, *C. laxiflora*, *C. pubescens*, etc., but the failures are not instructive and need not be reported in detail.

SUMMARY.

PUCCINIA SORGHI Schw., teleutospores, was shown capable of directly producing uredospores — no spermogonia or aecidia appearing.

This Rust (uredo stage) was readily and indiscriminately transferred to the six 'agricultural species' of Maize, *Zea mays amylacea*, *everta*, *indentata*, *indurata*, *saccharata*, and *tunicata*. Hence there are no 'biologic forms' of *PUCCINIA SORGHI* Schw.

This species was successfully grown on Teosinte, *Euchlaena luxurians*, which is a hitherto unreported host.

Attempted inoculation of *Sorghum vulgare*, *Saccharum officinarum*, and *Tripsacum dactyloides* were unsuccessful.

RUST FROM *HELIANTHUS TUBEROSUS* (Artichoke) was successfully used in inoculating *Helianthus annuus*, showing that the so-called *Puccinia helianthorum* Schw. is the same as *PUC- CINIA HELIANTHI* SCHW.

TELEUTOSPORES OF *PUCCINIA THOMPSONII* from *Carex frankii* were grown on *Sambucus canadensis* — showing that this Rust is *PUCCINIA SAMBUCI* (Schw.) Arth.

PERIDERMUM PINI was used in a successful inoculation of *Campanula americana* — showing that this form is contained in the life cycle of *COLEOSPORIUM CAMPANULAE* (Pers.) Lév.

ELEMENTARY MYCOLOGY.

W. A. KELLERMAN.

Continued.

It is quickly perceived that plants, so varied and diverse, possess in many cases evident affinity, *i. e.*, relationship with each other. A dozen Willows may be encountered and never would even a child call one of them an Oak, a Fern or a Toadstool. Seldom would a species of Oak, Fern or Toadstool be called by another name. The Roses are really all Roses to the tyro first noticing plants. Close inspection never fails to confirm this first impression. The wood, bark, buds, leaf-venation, flowers and catkins singly show, combined much more positively, the real relationship existing between these kinds, or *species* as they are called. The Rose Family—not exclusively the generally recognized genus of Roses—possesses usually five petals and many stamens, all inserted on the calyx tube—a badge of consanguinity that no other plants possess. The kinds of fruits, leaf-patterns, and many other structures of Rosaceous plants lead one as surely to a grouping of the hosts of these plants into the classes larger or smaller in which by nature they belong. A study of a Flora is largely a search for affinity in the numbers composing it. Looking out upon a landscape or sweeping the eye over prairie or grove yields no specific knowledge of the components that determine the impressions first experienced. An inspection of the individuals is the beginning point of our real knowledge of plants. The likeness of two or more—that is, possession of identical structures (or *characters* as we call them), suggests the idea of relationship between them—an impression that is greatly strengthened by wider experience; till finally the human mind can not resist the conclusion that the entire vegetable kingdom is embraced in this bond of unity. It scarcely need be added that other than mere superficial characters must be investigated—the internal structures, and the physiological phenomena (for these are usually associated with types of organs or anatomical peculiarities) need to be interpreted as well. In short the plant in its entirety, "all in all," must be subjected to the most critical study, and varied and crucial tests. It may be more than the recognizable mass of tissues or anatomical parts; it certainly is composed of matter of apparently various forms or kinds in which inheres remarkable physical energy—or as we say, in our ignorance of their full import, "vital forces."

SPECIES AND LESSER GROUPS.—Observation of the pronounced similarity or essential likeness of individuals enables us to speak at once of a "*kind*"—and this is precisely the idea expressed by the common word "*species*." No technical definition now need

if it could be given of "species" in the organic kingdom. Exact or essential similarity in all the characters manifest in the embryonic development through to maturity and ultimate death, is the leading idea contained in the word species. The individuals are almost invariably so closely similar that a more or less detailed description of any one would apply to all. Moreover, the likeness is so marked that the individuals may be unhesitatingly referred to a common and not very remote parentage. Again, under conditions which are understood — at least recognized — an individual, or set of individuals, may depart to a minor degree from the type as fixed in mind from an examination of many specimens of a kind or species. We would expect in this case that the descendants would show the same characters; to designate such a group the word *sub-species* is to be used. It should be said that at least occasional individuals would be found that connect by perceptible or indeed imperceptible gradations the sub-species with the type or normal species. Perhaps these are the incipient stages of a new species. Moreover, there are "sports" which are to be distinguished from real sub-species. In such case we would find a single individual with some remarkable variant structure — say a violet without a spur, a radiate-symmetrical flower when the normal form is irregular in shape, a Mushroom with lop-sided cap, a *Collybia radicata* without a "root," etc.; and in no instance of the "sport" do we expect the peculiar form to be repeated in the descendants. It may be added, however, that it is feasible "artificially" to multiply the sport and so produce many "individuals." This is done often by horticulturists and florists to obtain their so-called "new varieties," by excising portions of the "sport" and placing these "cuttings" in favorable conditions for continued growth. In this manner many of our ornamental plants and common kinds of cultivated fruit trees "originated"; they are multiplied on an enormous scale for commercial purpose by "grafting" and "budding." Any form of "vegetative" reproduction (as opposed to "seed-reproduction") of the "sport" would likewise continue its existence. In one sense therefore we may, for example, regard the countless millions of Ben Davis apple trees, the Alberta Peach, the Kiefer Pear, etc., as pieces of the one original plant or "sport" from which the first cutting was made. One other group-term is occasionally used by botanists which must here be explained, namely, "*forma*" or anglicised to "form." While this is the common English word it must be remembered that it has here a technical significance. It would be used when the individuals exhibit quite a minor variation; it would scarcely be sufficient to constitute a sub-species. Our knowledge of the Vegetable Kingdom is yet too limited to employ this characterization with much assurance or indeed advantage. And as a matter of fact, for the same reason the other groups, though more patent, are by no means conceived of

in exactly the same sense by different botanists. They are to be regarded as tentative terms—indispensable at present but will undoubtedly be inadequate if not quite incorrect when botanical science is more fully developed.

RACE, STRAIN, CLONE.—Though a brief treatise on Mycology scarcely demands the explanation of any other classificationary terms than those given above, yet it may be well to elucidate three other subordinate groups, namely, "Race," "Strain," and "Clone"—terms which have their chief use in connection with Agriculture and Horticulture and refer to groups in cultivation. By *Races* we indicate those which have not only well marked and differentiating characters but which propagate themselves true to seed, though slight individual variations would of course be expected. *Strains* include groups of cultivated plants that do no differ in appearance or botanical characters from a "Race" but exhibit some distinctive quality—it may be greater hardiness or adaptability, greater yield, etc. It is a vague distinction at best, and however important in practice, apparently of no botanical or scientific value. But the term "*Clone*" (from the Greek *Klon*, twig, spray or slip) indicates those plants that are propagated vegetatively, as by buds, grafts, cuttings, suckers, runners, slips, bulbs, tubers, etc.—all of which imply the handling of higher plants exclusively, but any vegetative method of multiplying a desirable species of Mushroom, for example, would likewise come under this head; these would not come true to seed. They are in fact the "individuals" obtained by "multiplying" a sport, or the single plant from which the first cutting or portion was obtained. The important fact to bear in mind is that the plants grown from such vegetative parts are *not individuals in the ordinary sense*, but are "transplanted" parts of the same individual and "in heredity, and in all biological and physiological senses such plants are the same individual."

GENUS, FAMILY, ORDER, CLASS.—As has been intimated the *species* (composed of individuals that are alike) is the convenient biological unit in the classification of organisms. It is the group first or most readily grasped, and therefore the most satisfactory starting point in a discussion of this subject. Going into the fields or woods the individual plants even on cursory examination would unhesitatingly be referred to the various species to which they evidently and really belong. It would also be perceived at once that some sets of species were much alike and others quite unlike. The several species, for example, of Red Oaks, of Black Oaks, of White Oaks, of Bur Oaks, etc., would be associated in mind, and the Willows, the Hickories, the Mints, the Mushrooms, etc., likewise would be readily grouped according to their natural affinities. The species first referred to would form the genus of Oaks (*Quercus*), and in like manner we would have the genus of Willows (*Salix*), the genus of Hickories (*Hicoria*),

the genus of Mints (*Mentha*), and the genus *Agaricus*. A genus then is a group of species that strongly resemble each other. There are always a few, a greater or lesser number of important or essential characters that are common to all the species of the genus; some one if not several or all of these distinctive points would be absent from every other genus of plants. Proceeding in the same manner with genera—that is, grouping those together which have some evident and important resemblance—we get *Families*; these consist of related genera. Again, Families of plants having evident relationship constitute *Orders*. These may be grouped in larger associations that can be denominated *CLASSES*, and thus the entire Vegetable Kingdom may be synoptically arranged.

NOMENCLATURE.—It has been found convenient and sufficiently definite for ordinary purposes to apply a scientific name to the numerous easily recognized kinds of plants and this consists simply of the *genus* and the *species*; thus the White Oak is called *Quer'-cus al'ba*, the Artichoke *He-li-an'-thus tu-ber-o'-sus*, the Common Mushroom *A-gar'-i-cus cam-pes'-tris*, the Morel *Mor-chel'-la es-cu-len'-ia*, the Sunflower Rust *Puc-cin'-i-a he-li-an'-thi* etc. The botanical name is therefore binomial, consisting of a generic and a specific name—the genus placed first, followed by the species. In case a sub-species is to be designated a trinomial would be used, as *He-li-an'-thus tu-ber-o'-sus sub-ca-nes'cens*, etc. Authors occasionally indicate a “form,” where in their opinion the designation of sub-species would scarcely or not at all be warranted, and in such case the scientific name might be a quadrinomial, or if a trinomial the name following the species would be used for a “form” (latinized to “*forma*,” or abridged to “*for.*” or “*f.*”). It will be found in Manuals, Monographs, Printed Lists, etc., that the author of the species-name is always indicated; thus *Quercus alba* L., and *Morchella esculenta* Pers., indicate that Linnaeus named the White Oak and that Persoon is the author of the botanical name of the Morelle. It sometimes happens that two different names have been applied to a species. In such case the one *first given* stands and all later names that may have been applied to that species are *synonyms* and to be discarded. In many cases it has happened that the true relationship of the plants was not correctly apprehended and therefore placed in a wrong genus; or it may be that subsequently a valid genus has been proposed by some botanist to receive a certain species or two or three species of one of the existing genera. In such case the name—for example, of the Kentucky Coffee tree—is written thus: *Gym-noe'-la-dus di-oi'-ca* (L.) Koch, and the explanation is this: Linnaeus took this plant to be a member of the genus *Guil-lan-di'-na*, and hence the name in early botanical literature was *Guil-lan-di'-na di-oi'-ca* L. (1753). Later another genus was proposed, *Gym-noe'-la-dus*; and it must be explained that a new spe-

cific name was (of course unwarrantably) coined at the same time for this plant, namely, *can-a-den-sis*, so that in American Manuals (except recent ones) the name of this tree stands as *Gymnoc'la-dus can-a-den-sis* Lam. (1869). But Koch restored the specific name originally applied by Linnaeus, and hence the botanical name of the Kentucky Coffee tree is followed by a double citation of authors and thus stands in print: *Gymnoc'la-dus di-oi'-ca* (L.) Koch. An example from Mycological literature is as follows: The Corn-Smut is now designated as *Us-ti-lá-go ze'-ae* (Beckm.) Ung., and the history of the nomenclature in this case is as follows. The Smut was called by Beckman *Ly-co-per'-don ze'ae*, and later Unger perceived its relationship to the forms included in the genus *Ustilago*, hence he is credited with this correct combination. *Ustilago maydis* — so commonly used in botanical publications is a synonym of the name as given correctly above. Still more complicated cases in which the principle of priority is concerned are those where there are two or three (or more) distinct spore-producing stages in the life cycle of the fungus. To illustrate this a common Rust on Wheat may be cited, namely, the species that has been generally called *Puc-cin'i-a gram'in-is*. This has its first stage (or first two stages) on Barberry leaves. It was originally named *Ly-co-per'-don poc-u-li-for'-mis* by Jacquin in 1786, but not at all understood, since it has no affinities with the Puffballs (*Lycoperdon*). Then in 1891 Gmelin named the Cluster-cup stage of this Rust, which occurs on Barberry leaves, *Ae-cid'i-um ber-ber'i-dis*. The last stage — in which the spores are called *teleutospores* — was named *Puc-cin'i-a gram'in-is* by Persoon in 1797. While it has been the common custom to designate this by the latter name, strict application of the principle of priority (which is certainly desirable) requires that the name be written as follows: *Puccinia poculiformis* (Jacq.) Wettst. — the latter author having in 1885 made this correct combination.

OHIO FUNGI. FASCICLE X.

W. A. KELLERMAN.

List of Species and Hosts.

181. *Coleosporium sonchi* (Pers.) Lév. on *Aster paniculatus* Lam.
182. *Dimerosporium collinsii* (Schw.) Thuem. on *Amelanchier canadensis* (L.) Medic.
183. *Erysiphe polygoni* DC. on *Polygonum erectum* L.
184. *Gloeosporium sanguinariae* E. & E. on *Sanguinaria canadensis* L.
185. *Gymnosporangium nidus-avis* Thax. on *Amelanchier canadensis* (L.) Medic.
186. *Kuehneola albida* (Kuehn) Mag. on *Rubus nigrobaccus* Bailey.

187. *Naemosphaera lactucicola* Kellerm. on *Lactuca virosa* L.
 188. *Peronospora floerkeae* Kellerm. on *Floerkea proserpinacoides* Willd.
 189. *Phyllactinea corylea* (Pers.) Karst. on *Celastrus scandens* L.
 190. *Phyllosticta iridis* Ell. & Ev. on *Iris versicolor* L.
 191. *Polythrincium trifolii* Kze. on *Trifolium repens* L.
 192. *Puccinia caricis* (Schum.) Reb. on *Carex riparia* Curt.
 193. *Puccinia fraxinata* (Lk.) Arthur on *Spartina dactyloides* (L.) Willd.
 194. *Puccinia peckii* (DeT.) Kellerm. on *Carex trichocarpa* Muhl.
 195. *Rhinotrichum curtisii* Berk on *Platanus occidentalis* L.
 196. *Septoria malvicolai* Ell. & Martin on *Malva rotundifolia* L.
 197. *Uromyces hedsari-paniculati* (Schw.) Farl. on *Meibomia paniculata* (L.) Kunze.
 198. *Uromyces lespedezae* (Schw.) Peck on *Lespedeza violacea* (L.) Pers.
 199. *Uromyces phaseoli* (Pers.) Wint. on *Strophostyles helvola* (L.) Britt.
 200. *Uromyces sparganii* Cke. & Pk. on *Sparganium eurycarpum* Engelm.

181. *Coleosporium sonchi* (Pers.) Lév.

On *Aster paniculatus* Lam.

Buckeye Lake, Licking Co., Ohio. Oct. 26, 1904.

Coll. W. A. Kellerman.

"*VREDO SONCHI ARVENSIS*: conferta subconfluens fulua, cespitulis planiusculis irregularibus." D. C. H. Persoon. Synopsis Methodica Fungorum, 217. 1801.

182. *Dimerosporium collinsii* (Schw.) Thüm.

On *Amelanchier canadensis* (L.) Medic.

Lancaster, Fairfield Co., Ohio. Oct. 18, 1904.

Coll. W. A. Kellerman.

"*SPHAERIA COLLINSII*, L. v. S., valde abnormis — in aversa pagina folii ignoti (an exoticci) mihi ab doctissimo Zachhaeo Collins communicate est.

"S. tomento crasso denissime intertexto efficiente plagas latas effusas inter nervos paginae aversae folii ignoti, e fusco-nigras, floccis suberectis. Subiculo huic floccoso, ereberimne incident perithecia globosa, nigra (S. nidulanti proxima) astoma, vel saltem indistincta ostiolata, sed demum globulo spermatico irregulari, caseos continens, coronata." L. D. de Schweinitz. Transaction of the American Philosophical Society, Philadelphia, N. S. 4:211. 1834.

183. *Erysiphe polygoni* DC.

On *Polygonum erectum* L.

Fernwood, Jefferson Co., Ohio. July 24, 1902.

Coll. W. A. Kellerman.

"*Erysiphé de la renouée. Erysiphe polygoni*.

"Les tubercles sont d'abord jaunes, ensuite organés, bruns et noirs; ils émettent en dessous une multitude de filaments blancs, rameux, entrecroisés, qui forment un tissu membraneux étendu sur toute la feuille; ce tissu est plus épais que dans les autres espèces, et se sépare de la feuille sans difficulté. J'ai trouvé cette espèce au commencement de l'été, sur la face inférieure des feuilles des la renouée des petits oisenaux." De Candolle, Flore Française, 2:273. 1815.

184. *Gloeosporium sanguinariæ* E. & E.

On *Sanguinaria canadensis* L.

Columbus, Ohio.

1903.

Coll. W. A. Kellerman.

"*Gloeosporium Sanguinariae* E. & E.

"Spots yellow, oblong or irregular, 3-5 mm. diam., situated near the apex of the leaf which is more or less uniformly blackened. Acervuli epiphyllous, numerous, innate, yellow and inconspicuous. Conidia oblong, hyaline, continuous, mostly a little curved, $8-15 \times 3\frac{1}{2}-5\frac{1}{2} \mu$." J. B. Ellis and E. M. Everhart. Proceedings of the Academy of Natural Sciences of Philadelphia, 1894:371. 30 Nov. 1894.

185. *Gymnosporangium nidus-avis* Thax.

Roestelia nidus-avis.

On *Amelanchier canadensis* (L.) Medic.

Sandusky, Erie Co., Ohio.

July, 1904.

Coll. W. A. Kellerman.

"*Gymnosporangium nidus-avis*, nov. sp.

"Sporiferous masses when young, cushion like, irregularly globose or oval, small and distinct or elongate and confluent according to the habitat; rich red brown; when mature indefinitely expanded by moisture, orange-colored. Teleutospores two-celled, irregular in shape broadly ovate to sub-elliptical or fusiform, bluntly rounded or slightly tapering towards the apex, symmetrical or often slightly bent. Average dimensions .055 x .025 mm. Promycelia several, not uncommonly proceeding from either extremity. Pedicels when young often more or less inflated below the spore. Mycelium perennial in leaves, branches or trunks of *Juniperus Virginiana* very commonly inducing a "bird's nest" distortion.

"*Roestelia* stage. Spermogonia yellowish orange, preceding the aecidia by about ten days. Aecidia hypophyllus or more commonly on petioles, young shoots and especially on young fruit, densely clustered, brown, at first subulate, then fimbriate; the peridia splitting to the base with its divisions slightly divergent. Peridial cells rather slender; the ridges somewhat prominent, sublabyrinthiform, horizontal or becoming inwardly oblique towards the extremities. Average measurements (towards the apex of the peridia) .07 x .018 mm. Aeciospores smooth, spherical or irregularly oval to oblong, average diameter 25 mm." Roland Thaxter. Connecticut Agricultural Experiment Station, Bulletin No. 107:6. April 15, 1891.

186. *Kuehneola albida* (Kühn) Magn.

Chrysomyxa albida Kühn.

On *Rubus nigro'baccus* Bailey.

Sandusky, Erie Co., Ohio.

July 21, 1903.

Coll. W. A. Kellerman.

"Seit dem 14 August d. J. beobachtete ich . . . auf *Rubus fruticosus* L. einen ziemlich häufig vorkommenden Parasiten, der an der Unterseite der Blätter kleine, rundliche Häufchen von rein weißer bis

gelblich-weisser Färbung bildet. Die Grösse . . . 0,25-0,5 mm; . . . zuweilen nur vereinzelt, in der Regel aber zahlreich, heerdenweise auf, sind aber immer isolirt, auch bei dichterer Stellung nicht zu grösseren Flecken zusammenlaufend . . . Dem blosen Auge erscheinen die Häufchen . . . ziemlich scharf umgrenzt, . . . bei stärkerer Vergrösserung erkennt man, dass dies durch hervorragende, relativ dicke Fadenenden hervorgerufen wird, welche bei näherer Untersuchung als die unverästelten oder mehr oder weniger verzweigten Sporen einer Chrysomyxa sich ausweisen. Sie bestehen aus einer wechselnden Zahl von Zellen; ohne die Tragezellen sind bei den einfachen Sporen wie bei den Aesten der verzweigten meist 5 bis 6 Zellen vorhanden; die Zahl derselben kann aber auch nur seltner, bei manchen Sporenästen bis auf 2. Grösse und Gestalt der einzelnen Sporenzellen . . . äusserst mannichfaltig, . . . an die Teleutosporen von *Puccinia coronata* erinnernd. . . . Die Seitenwand der meisten Sporen ist in der Weise verdickt, dass die Verdickung von unten auf nur gering ist, von der Mitte aus stärker zunimmt und seitlich des Scheitels ihre grösste Stärke erreicht, hier häufig auch abgerundete, mehr oder weniger bedeutende Hervorragungen bildend, die namentlich den Endzellen oft ein kronenartiges ausschenen erteilen. Der Scheitel selbst nimmt an der Verdickung mehr oder weniger Theil. Abweichend hiervon findet sich nun bei oberen Zellen, gar keine Verdickung, oder dieselbe kommt nur in sehr mässigem Grade ganz oben seitlich und am Scheitel vor. . . . Die einzelnen Sporenzellen sind von regelmässig cylindrischer oder dem Eiförmigen sich nähernder Gestalt; nicht selten zeigen sie auch eine abgestutzte Kegelform, so dass sie von der schmäleren Basis aus gleichmässig nach oben sich verbreiten; zuweilen kommen auch unregelmässige, an einer Seite oder an einer einzelnen Stelle mehr ausgebauchte Formen vor. Stark gekrönte Endzellen haben nicht selten im Längsdurchschnitt eine kelchförmige Gestalt. Auch die Grösse der einzelnen Zellen ist ungleich. Sehr häufig zeigen sie eine Länge von 30μ bei $21, 4 \mu$ durchschnittlicher Breite; es kommen aber auch Zellen mit nur 17μ Länge und $21-26 \mu$ Breite vor. Andererseits findet man mitunter auch relativ längere und schmälere Formen, wie beispielsweise eine Breite von nur 15μ bei $47, 2 \mu$ Länge. . . . Membran und Inhalt der Zellen ist ungefärbt. Die Keimung der Sporenzellen von *Chrysomyxa albida* erfolgt bei günstiger Witterung sogleich nach der Reife, und ältere Häufchen enthalten daher in der Regel nur noch leere Sporenzellen. Die Sporen dieses Parasiten keimen ungemein leicht, selbst über Nacht unter dem Deckglas, sobald sie genügend feucht erhalten werden. . . . Die runden, genabelten Sporidien . . . beträgt 8, 5 bis 9, 5 μ .

Die kleinen und mittelgrossen Häufchen werden in der Regel nur von den Teleutosporen der *Chrysomyxa* gebildet, bei grösseren Häufchen findet sich dagegen meist ein Uredo mit vor, das auch isolirt in der Form kleiner, lichtgelber bis citronengelber Häufchen vorkommt, . . . Diese Uredosporen . . . sind feingewarzt und haben eine durchschnittliche Grösse von 26μ , sind jedoch sehr wechselnder Gestalt: rundlich, eiförmig und unregelmässig vieleckig." Julius Kühn. Botanisches Centralblatt, 16:154-7. 1883.

187. *Naemosphaera lactucicola* Kellerm.

On old stems of *Lactuca virosa* L.

Columbus, Ohio.

1904.

Coll. W. A. Kellerman.

"*NAEMOSPHAERA LACTUCICOLA* Kellerm. n. sp.— Pycnidia beaked, clustered but distinct, occupying large areas, deeply seated, at maturity barely perforating the epidermis, black, brittle, globular to pyriform, 150-

250 μ in diameter, ending in a rather broad beak of varying length, but usually about one-half that of the pycnidium; spores brown with an olivaceous tint, broadly oval or oblong, not septate, 18-24 x 7-12 μ ." W. A. Kellerman. *Journal of Mycology*, 10:114. May 1904.

188. *Peronospora floerkeae* Kellerm.

On *Floerkea proserpinacoides* Willd.

Columbus, Ohio.

May 15, 1903.

Coll. W. A. Kellerman.

"*PERONOSPORA FLOERKEAE* Kellerm. n. sp.— Conidiophores stout (16-18 μ wide) simple below and elongated, irregularly and profusely branching above, the branches again subdividing sometimes dichotomously but oftener irregularly, the ultimate branchlets more or less plainly dichotomous also much elongated and strongly curved; the branches are very much narrower than the main axis of the conidiophore, the ultimate branches being very narrow and bearing large hyaline oval or sub-globose conidia 24-32 x 18-25 μ ; germination unknown. Oospores numerous, sub-globular, 24-36 μ , the wall light brown and smooth or slightly rugose." W. A. Kellerman. *Journal of Mycology*, 10:172. July, 1904.

189. *Phyllactinia corylea* (Pers.) Karst.

(*P. suffulta* [Reb.] Sacc.)

On *Celastrus scandens* L.

Sandusky, Erie Co., Ohio.

Oct. 15, 1904.

Coll. W. A. Kellerman.

"*SCLEROTIVM ERYSPHE*: epiphyllum, granulis aggregatis fusco-nigris, tomento albo insidentibus. *Obs. myc.* 1. pag. 13.
b. *corylea*: tomentum tenuissimum, fungillis in disco impresso subulosis." D. C. H. Persoon. *Synopsis Methodica Fvngorum*, 124. 1801.

190. *Phyllosticta iridis* Ell. & Ev.

On *Iris versicolor* L.

Sandusky, Erie Co., Ohio.

July and October, 1904.

Coll. W. A. Kellerman and H. H. York.

"*Phyllosticta Iridis* E. & M.

"Perithecia amphigenous, minute, buried in the leaf, with only the papilliform apex visible, 4-6 together on small ($\frac{1}{2}$ -1 mm.), dark purple spots thickly scattered over the leaf which at length becomes reddish-brown and dead at the apex and along the sides. Sporules oblong-cylindrical, hyaline, nucleolate, 9-11 x 2 $\frac{1}{2}$ μ , abundant. The spots soon become dirty white in the centre." J. B. Ellis and B. M. Everhart. *Proceedings of the American Academy of Natural Sciences of Philadelphia*, 1893:456. 1893.

191. *Polythrincium trifolii* Kunze.

On *Trifolium repens* L.

Columbus, Ohio.

June 25, 1903.

Coll. W. A. Kellerman and O. E. Jennings.

"*Polythrincium Trifolii* findet sich im Sommer und Herbst auf der Unterseite grüner Blätter mehrerer Kleearten (*Trifolium pratense*, alpestre, fragiferum), dem unbewaffneten Auge als schwarze Flecken mit gelb gefärbtem Rande erscheinend. Die Mikroskopische Untersuchung zeigt, dass die unregelmässigen Flecken aus gerundeten, genäherten, selten zusammengeflossenen Räschen bestehen, welche nicht die Grösse eines Leinsamens erreichen. Fig. 8. a stellt eine durch die Linse A vergrösserte Gruppe kleiner Räschen vor, welche dem eyförmigen, zweyfachrigen körner liegen ursprünglich auf dem obengedachten Pseudostroma um die Basis der Fäden, so dass sie leicht übersehen werden können. Dies und das Vorkommen des Pilzes auf lebenden Pflanzenteilen kann leicht dazu verführen, diese Gattung unter die Entophyten, in die Nähe von *Phragmidium* Lk. (*Aegma* Fries, und *Puccinia* Nees) zu bringen. Pressst man den Durchschnitt eines Häufchen zwischen zwey mit Wasser benetzten Glasplatten zusammen: so treten die Sporidia deutlich hervor (fig. 8. b. durch B.). Man bemerkt dabey, dass die körner nicht etwa abgesetzzene Endgleider der Fasern sind. Fig. c. d. noch stärkere Vergrösserung einzelner Fasern durch c."

"Von einigen Botanikern erhielt ich diesen keineswegs seltenen, Pilz, den ich öfters bey Leipzig und Lauchstädt bemerkte, für *sphaeria Tri-*
folii P." Kunze, in Mykologische Hefte, 1:14-15. 1817.

192. *Puccinia caricis* (Schum). Reb.

Uredo and Teleuto.

On *Carex riparia* Curt.

Columbus, Ohio.

July 26, 1902.

Coll. W. A. Kellerman.

Supplement to No. 71.

193. *Puccinia fraxinata* (Lk.) Arthur.

P sparganoidis E. & B., *P. peridermiospora* Arth.

Teleuto

On *Spartina dactyloides* (L.) Willd.

Sandusky, Erie Co., Ohio.

Oct. 15, 1904.

Coll. W. A. Kellerman.

"*Puccinia sparganoidis* Ell. & Barth.

"II and III. Amphigenous. Uredosori very narrow, orange-yellow, about one mm. long, at first covered by the epidermis, then naked. Uredospores obovate or pyriform, orange-yellow, aculeate, stipitate, $25-35 \times 14-20 \mu$. Teleutosori small, elliptical or linear, $1-1\frac{1}{2}$ (exceptionally $2-2\frac{1}{2}$) mm. long, soon naked nearly black. Teleutospores oblong-elliptical or oblong-clavate, very slightly constricted, $35-55 \times 15-20 \mu$, rounded, or often obtusely pointed above, mostly narrowed below into the stout, persistent, $40-50 \mu$ long, sub-equal, hyaline pedicel. Episporae smooth, distinctly thickened above." J. B. Ellis and Elam Bartholomew. *Erythea*, 4:2. 1896.

194. *Puccinia peckii* (DeT.) Kellerm.

Uredo and Teleuto.

On *Carex trichocarpa* Muhl.

Columbus, Ohio.

July 26, 1902.

Supplement to No. 28.

The name on label for No. 28 should be changed to accord with No. 194.

195. *Rhinotrichum curtisii* Berk.On Rotten wood of *Platanus occidentalis* L.

Sandusky, Erie Co., Ohio.

Aug. 10, 1904.

Coll. W. A. Kellerman.

"Rhinotrichum Curtisii. B.—Aureum; floccis deorsum divisus flexuosis apice tumidis; sporis subglobosis. *Asperillus laneus*. Schwein."

"Threads more or less branched, flexuous, sometimes curved above (as in specimens from Venezuela), articulate, the upper joint swollen, with occasionally a second, covered with little spicules, to which the globose or subglobose spores, .0005 in. diameter, are attached." M. J. Berkeley. Grevillea, 3:108. March, 1875.

196. *Septoria malvicola* Ell. & Martin.On *Malva rotundifolia* L.

Columbus, Ohio.

Oct. 13, 1904.

Coll. W. A. Kellerman.

"SEPTORIA MALVICOLA, E. & M. n. s.

"Spots gray, partially limited by the veinlets, 2-3 millim. broad, clustered and coalescing, bordered by a yellow discoloration; perithecia black, subglobose at first, afterwards depressed, thinly membranaceous, clustered, numerous, mostly epiphyllous, 90-100 μ ; sporules hyaline, linear, ends obtuse, a little curved, faintly 3-4-septate, 30-37 x 1 μ . On leaves of *Malva rotundifolia*. George Martin. Journal of Mycology, 3:65. June, 1887.**197. *Uromyces hedsyari-paniculati* (Schw.) Farl.**On *Meibomia paniculata* (L.) Kunze.

Lancaster, Fairfield Co., Ohio.

Oct. 8, 1904.

Coll. W. A. Kellerman.

Supplement to No. 37.

198. *Uromyces lespedezae* (Schw.) Peck.On *Lespedeza violacea* (L.) Pers.

Sugar Grove, Fairfield Co., Ohio.

Oct. 8, 1904.

Coll. W. A. Kellerman.

Supplement to No. 39.

199. *Uromyces phaseoli* (Pers.) Wint.On *Strophostyles helvola* (L.) Britt.

Sandusky, Erie Co., Ohio.

Aug. 10, 1903.

Coll. W. A. Kellerman.

"*VREDO APPENDICVLATA*: badia, sporulis rotundatis caudatis. *Obs. myc.* pag. 17.

"*a. Vredo Phaseoli*: conferta subconfluens badia puluinata inquinans." D. C. H. Persoon, *Synopsis Methodica Fvngorum*, Pars Prima, 222. 1801.

200. *Uromyces sparganii* Cke. & Pk.On *Sparganium eurycarpum* Engelm.

Buckeye Lake, Licking Co., Ohio.

Oct. 26, 1904.

Coll. W. A. Kellerman.

"*Uromyces Sparganii* C. & P.

"Sori minute, oblong, crowded, black, spores pyriform or oblong-pyriform, about .001 in. long; pedicel colored, shorter than or equal to the spore in length." Chas. H. Peck. Report on the New York State Museum, 26:77. 1874.

NOTES FROM MYCOLOGICAL LITERATURE X.

W. A. KELLERMAN.

PART II, INOCULATION — experiments with the conidia of *E. graminis* on species of *Bromus*, is a continuation of the article by Ernest S. Salmon, on *Erysiphe graminis* DC. and its adaptive parasitism within the genus *Bromus*. This important and extended work is given in detail and reference to the original only can be made here, (Ann. Mycologici, 2:307-343, Juli 1904), but a sentence or two may be transcribed: Now it is possible, by a cultural method I have lately described — in which the leaf to be inoculated is injured by the removal of a minute piece of leaf tissue — to demonstrate that the immunity shown by a plant against a certain fungus disappears when the normal vitality of the leaf is interferred with. . . . It is possible also that the susceptibility ultimately shown by these plants of *B. racemosus* on being kept for several weeks in the laboratory, may be accounted for in some cases by the fact that the health of the plants became gradually impaired by the unfavorable condition of growth.

THE JOURNAL OF MYCOLOGY FOR JULY 1904 contained the following articles: Morgan — New Species of Pyrenomycetes;

Holway—Notes on Uredineae, II; Ricker—Notes on Fungi, I; Ellis and Everhart—New Species of Fungi; Kellerman—A New Species of *Peronospora*, Cultures of *Puccinia Thompsonii*, Elementary Mycology (continued), Index to North American Mycology, Notes from Mycological Literature, XI; Kellerman and Ricker—New Genera Published Since 1900.

IN THE MARCH NO. OF THE JOURNAL OF MYCOLOGY (1904) the following articles were published: Morgan—A New Melogramma; Cockerell—Some Fungi Collected in New Mexico; Dudley and Thompson—Notes on California Uredineae and Descriptions of New Species; Kellerman—Ohio Fungi (Fascicle IX), Minor Mycological Notes (III), Index to Uredineous Culture Experiments (Concluded), Notes from Mycological Literature (IX), Elementary Mycology.

THE ARTICLES IN THE MAY NO. OF THE JOURNAL OF MYCOLOGY were: Morgan—*Tubercularia Fasciculata* Tode; Smith—A New Egg Plant Fungus; Durand—Three New Species of Discomycetes; Christman—Variability of *Dictyophora*; Cockerell—A New *Hypholoma*; Clements—A Translation from Saccardo: *Diagnostica*; Kellerman—A New Species of *Nemosphaeria*, Minor Mycological Notes (IV), Index to North American Mycology, Elementary Mycology (Continued), Notes from Mycological Literature; Kellerman and Ricker—New Genera Published Since 1900.

AECIDIUM INULAE-HELENII CONST. N. SP. AND UROMYCES VICIAE-CRACCAE CONST. N. SP. are two new Uredineae described by J. C. Constantineanu in *Annales Mycologici*, 2:250-3, Mai 1904, collected in Roumania. Hitherto no Aecidium has been found on the Elecampane. The Uromyces on *Vicia cracca* approaches *U. striatus* in having striae—*membrana longitudinaliter lineolis parallelibus vel anastomosantibus praeditis, raro quasi laevibus*; but the form and color of the papilla is characteristic—*apice papilla conica obtusa, hyaline ornatis*.

THE SECOND INSTALLMENT OF ASCOMYCETES AMERICAE BOREALIS, autore Dr. H. Rehm, is given in *Annales Mycologici* for July 1904. Those enumerated are Nos. 27-39. Three of them are new species, and most of them are new names.

UEBER DAS AUFTREten VON PLASMOPARA CUBENSIS IN OESTERREICH, von Dr. Ludwig Hecke, *Annales Mycologici*, 2:354-8, Juli 1904, shows that this Mildew has entered Austria (not before reported in that country nor in Germany). The author notes the present distribution as follows: Cuba, 1868, Japan 1889, and same year disastrous in North America, Mandchurei 1876, lately England also in Hungary. This author also states: Während also die Form der Sporangiensträger dieses

Pilzes und die braun-violette der Sporangienwand mit gewissen Peronospora-Arten der Gruppen Intermediae und Undulatae fast vollkommen uebereinstimmt, muss der Pilz nach der gegenwärtigen Guttungsbezeichnung doch wegen der Keimung mittelst Schwärmsporen zur Gattung *Plasmopara* gestellt werden.

MYCOLOGICAL NOTES, No. 17, C. G. Lloyd, June 1904, consists of Notes of Travel, 272; The History of Geaster *fornicatus* in England, 273; N'abusez pas du Microscope, 274; Erroneous Genera and Species, 275; *Anthurus borealis* in England, 276; *Polysaccum boudievi*, 277; *Quiletia mirabilis*, 278; The Name *Polysaccum*, 279; Austra- Fairy-ring Puff Ball, 280; Historical Notes, 281; Types, 282; *Oza-wahp-abe-sah*, 283; *Anthurus borealis* in Massachusetts, 284.

THE ARTICLES IN THE JULY NO. OF THE ANNALES MYCOLOGICI (1904) are as follows: Salmon, On *Erysiphe graminis* DC., and its adaptive parasitism within the genus *Bromus* (fortsetzung); McAlpine, Some Misconceptions concerning the Uredospores of *Puccinia pruni* Pers., and Note on the Arrangement of Teleutospores in *Puccinia pruni* Pers.; Sydow, Neue und kritische Uredineen; Rehm, Ascomycetes Americae borealis, II; Hecke, Ueber das Auftreten von *Plasmopara cubensis* in Oesterreich; Oudemans, *Puccinia veratri*; Trotter, Intorno all' Uromyces giganteus Speg.; Bubák, Vorläufige Mitteilung ueber Infektionsversuche mit Uredineen im Jahre 1904.

D. McALPINE exposes some Misconceptions concerning the Uredospores of *Puccinia pruni* Pers. in Annales Mycologici, Juli 1904 (2:344-8), showing that there are not two kinds as often maintained — with and without thickened apex — but one kind only, always too with apical thickening. He also shows the fallacy of claiming here the existence of a *Uromyces amygdali* — for such spores represent merely the Uredo stage of *Puccinia pruni*. Two nuclei were detected in the uredospores — one only in the teleutospores. The author also noted a ball-like arrangement of the teleutospores.

THE POLYPORACEAE OF NORTH AMERICA, VIII — *Hapalopilus*, *Pycnoporus* and new monotypic genera — an article of 14 pp. in the August No. of the Bulletin of the Torrey Botanical Club, by William Alphonso Murrill, contains notes on the species, keys to the species, synonyms, distribution, also a synopsis of the genera treated in articles I-VIII of this series. The new genera proposed are: *Abortiporus*, type *Boletus distortus* Schw.; *Cyclomyctella*, type *Boletus pavonius* Hook.; *Cycloporus*, type *Cyclomyces greenei* Berk.; *Globifomes*, type *Boletus graveolens* Schw.; *Nigrofomes*, type *Polyporus melanoporus* Mont.; *Poronidulus*, type *Boletus conchifer* Schw.

JOURNAL OF MYCOLOGY

A Periodical Devoted to North American Mycology. Issued Bi-monthly; January, March, May, July, September and November Price, \$2.00 per Year. To Foreign Subscribers \$2.25. Edited and Published by

W. A. KELLERMAN, PH. D., COLUMBUS, OHIO.

NOTES.

The March No. of the JOURNAL will be delayed a month or more by the absence of the editor, who will spend the winter months in Guatemala, Central America, collecting parasitic fungi. Letters sent to Columbus as usual will receive attention.

This No. of the JOURNAL is smaller than usual because its early appearance was necessitated. The delayed March Number will restore the normal size.

INDEX TO VOLUMES 1-10.—At an expense of much time and many printed pages a complete Index to date ends Volume 10, which doubtless will be of the greatest convenience to mycologists. Perhaps some persons will wish a separate copy—which can be furnished for 75 cents.

PHYLLACHORA ADOLPHIAE ELL. & KELLERM. A SYNONYM OF PHYLLACHORA MEXICANA Turconi. With the title "A New Phyllachora from Mexico" there was published a species that had been previously published by Malusio Turconi. We were not aware at the time that Prof. A. L. Herrera had sent material to anybody but ourselves, hence one cause for the misfortune. Turconi's description was published in Atti dell' Ist. Bot. Univ. di Pavia, which was tardy in reaching us. His species, two forms, are here appended.

PHYLLACHORA MEXICANA TURCONI N. SP.—*Stromatibus numerosis, dense gregariis, rarius confluentibus, subrotundis vel eliptico-elongatis; prominulo-applanatis vel leniter convexis, laevibus, atro piceis, minutis 1-2 mm. diam, denique longitudinaliter fissis, 2-4 locularibus; loculis globoso-depressis vel lenticularibus, ascis cylindraceis 80-110, 12-15 μ superne rotundatis, infere brevissime et spurie attenuato pedicellatis, paraphysatis, octosporis, sporis oblique monostichis, rarius subdistichis, ovato-elipsoideis, utrinque rotundatis, hyalinis 11-15, 6.5-8 μ , granulosis.*

In ramulis vivis Adolphiae infestae, Mexico.

CYTOSPORINA ADOLPHIAE.—*Stromatibus nigris, prominulo applanatis, minutis (habitu externo Ph. mexicanae) irregulariter plurilocularibus, loculis plerumque irregulariter sinuosis, rare subrotundis, sporulis copiosissimis, filiformibus exilissimis, plerumque leniter curvatis, rarius rectis vel leniter flexuosis, utrinque acutatis 23-25, 1 μ hyalinis, basidiis cylindricis 25-2 μ dense fasciculatis, hyalinis suffultis.*

In ramulis vivis Adolphiae infestae socia Phyllachora mexicana cuius status spermogonius esse mihi videtur.

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